The Genevac HT-24 Series II Workstation

User Manual

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Part Number 10-1562

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Amendment Control Form

Revision Number.	Issue and Reason for Change	Date Issued
1	Changes to Declaration of Conformity. Defrost and Drain note added.	January 2004
2	Changes to Declaration of Conformity.	February 2004
3	Introduction of new Pre-Set runs 51 -100 within the software.	01 March 2004
4	Introduction of Warranty Statement	26 April 2004
5	Introduction of Entrapment Warning	21 May 2004
6	Updated Images	02 June 2004
7	Definition of acceptable Out Of Balance Criteria	14 July 2004
8	Changes to Declaration of Conformity.	21 September 2004
9	Updated Waste Container images and change in Height dimensions.	08 December 2004
10	Information on the correct use of SampleGuard Probes	28 September 2005

These instructions are subject to change without notice.

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These operating instructions should be read before you use the Genevac HT-24 Evaporating System.

Keep them near the system for easy reference.

Your attention is drawn in particular to Paragraph 2 Safety and Maintenance Notes.

1 Introduction

Drawing on extensive experience in the drug discovery field, the HT-24 Workstation is designed to provide very high performance coupled with ease of use, occupying the minimum of laboratory space. The HT-24 comprises a Workstation/Trolley complete with 2 condensers, 1 for each evaporator, a Scroll Pump and an 11 litre Solvent Waste Container.

The HT-24 can accommodate 2 x HT-8 or 2 x HT-12 Series II evaporators or a combination of both, although it can also be used with a single evaporator installed at either position. Position 1 is the left hand position viewed from the front.

The status of each individual evaporator is displayed and controlled on a single keypad, display module indicating the run time, the vacuum, rotor temperature and chamber temperature on digital displays.

Simple to use up-down controls enable the run time, rotor and chamber temperatures to be set in an instant and single push buttons set the other functions.

Either evaporator can run independently or both evaporators can run together. Processing can be staggered; one unit working, the other being emptied/ filled. Simultaneous extraction of independent solvents is possible, using both evaporators, provided that these do not react within the drain circuit and waste container.

The condensers are capable of chilling, defrosting and draining independently, using smart technology integrated with V2-01 software.

A load cell monitors the level of fluid in the Waste Solvent Container. When the predetermined weight is reached, the Waste Full lamp on the HT-24 control panel will illuminate and an audible buzzer will sound. The volume of waste solvent in the container varies upon the individual solvents used due to their specific gravity. A static-dissipating device is in contact with the waste container when it is fitted to the HT-24.

The single scroll pump is shared between the 2 evaporators by means of a vacuum valve manifold, which intelligently switches the pump to each evaporator.

Data Logging is available independently from each evaporator. Dependent on user hardware, both evaporators could be logged to the same PC.

A custom fume hood is available as an option, providing a totally enclosed system. This is fitted on top of the HT-24. There are 3 sliding transparent doors in the front for easy access to the evaporators and a window in each side. Fumes are extracted by connecting a suitable duct to the Exhaust Spigot in the roof of the fume hood from your extraction system. A flow meter is located in the top right corner to monitor performance.

This manual will guide you through the start up requirements, set up needs and operation of the system to facilitate the most efficient procedure to protect your product's integrity and to ensure optimum performance at all times.

Details

HT-24 Fitted with 2 x HT-12 Complete With "Optional" Fume Hood - Front View
Note: 3 Sliding doors in fume hood for easy access

Scroll Pump & Catch Pot Door Open

Control Panel

Waste Solvent Container Door Open

Details (Continued)

OPEN CHAMBER 1 BUTTON
Press to open chamber door on evaporator 1

OFF BUTTON
Press to turn off HT-24 and evaporators

EMERGENCY STOP
Press to use. Used in an emergency to isolate Mains Power to the HT-24

Control Panel

WASTE FULL LED
Illuminates when Waste Solvent Container is full

OPEN CHAMBER 2 BUTTON
Press to open chamber door on evaporator 2

ON BUTTON
Press to turn on HT-24 and evaporators

POWER ON LED
Illuminates when HT-24 is switched on

THE EMERGENCY STOP BUTTON IS NOT TO BE USED TO SHUT DOWN THE SYSTEMS ON A ROUTINE BASIS.

Details (Continued)

HT-24 Rear View
Fume Hood rear panel removed for clarity

Data Connections x 2
& Waste Solvent Pump

Mains Power Supply Connections x 3
& Electrical Circuit Breakers

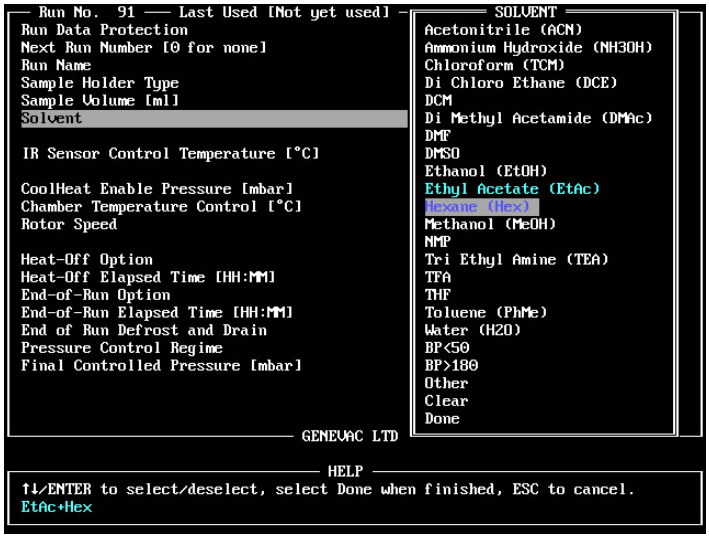
List of Solvents

Solvent	Density (g/cm^3)	Density Temp. (°C)	Autoprogram Available
Acetic Acid	1.05	20	N
Acetonitrile (ACN)	0.79	20	Y
Ammonium Hydroxide (NH3OH)	0.90	20	Y
Chloroform (TCM)	1.48	20	Y
Dichloroethane (DCE)	1.24	20	Y
Dichloromethane (DCM)	1.33	20	Y
Dimethylacetamide (DMAc)	0.94	20	Y
Dimethylamine (DMA)	0.68	20	N
Dimethylformamide (DMF)	0.94	25	Y
Dimethylsulfoxide (DMSO)	1.10	20	Y
Ethanol (EtOH)	0.79	20	Y
Ethyl Acetate (EtAc)	0.90	20	Y
Hexane (Hex)	0.65	20	Y
Isopropanol	0.79	20	N
Methanol (MeOH)	0.79	20	Y
N-Methyl-2-pyrrolidone (NMP)	1.02	25	Y
Pyridine	0.98	20	N
Tetrahydrofuran (THF)	0.89	20	Y
Toluene (PhMe)	0.87	20	Y
Tri Ethyl Amine (TEA)	0.73	20	Y
Trifluoroacetic acid (TFA)	1.54	20	Y
Water	1.00	20	Y

HCl, Thionyl Chloride or Di Ethyl Ether compatibilities are not available.

Genevac and the ATEX Directive:
Please note that it remains the responsibility of the user to consider any solvents being evaporated within the context of the ATEX directive. The presence of solvents on the list above indicates only that they will not damage the system. If further information is required, please contact your Sales Representative or visit http://www.genevac.com/

Those solvents with a “Y” in the “Autoprogram Available” column are available from the “Solvent” drop down list when setting up a run. The solvents with an “N” against them will have to be entered using the “Other” option and the rest of the data entered manually.



2 Safety and Maintenance Notes

2.1 Symbols

The following safety symbols are used throughout this manual. The definitions and scope of each symbol is as described below.

WARNING

THIS SYMBOL INDICATES HAZARDS THAT CAN LEAD TO SERIOUS MATERIAL DAMAGE OR POTENTIAL SERIOUS INJURY.

Caution

This symbol provides information about hazards that can be harmful to your health or lead to material damage.

Note

This symbol provides information about technical requirements, which if not followed, can lead to malfunctions, inefficiency and reduced productivity.

This symbol indicates that there may be a risk to sample integrity.

2.2 Safety

BEFORE OPERATING THE SYSTEM, IT IS IMPORTANT THAT THE FOLLOWING NOTES ARE READ TO ENSURE THAT THE IMPLICATIONS TO THE SAFETY OF PERSONNEL OPERATING THE SYSTEM AND FOR THE PROTECTION OF SAMPLE INTEGRITY ARE UNDERSTOOD.

Samples in the evaporator chamber are subjected to accelerations of up to 500G with a maximum load capacity of 1.5 kg for each rotor position.

The following precautions should therefore **always** be observed.

2.3 Safe loading of evaporator

Never exceed the maximum load capacity of 1.5 kg for each rotor position.

Always balance all tubes within 10g (+/- 5g).

When only one system is being used the acceptable max Out Of Balance (OOB) is 85g, but when both systems are being used the acceptable max OOB per system is 65g.

Always locate tubes correctly in sample holders.

Always locate sample holders correctly in the rotor aperture.

Always load two or four swings of the same type and version in opposite and balanced configurations.

For partially loaded holders, evenly distribute tubes in sample holders.

Always rotate the rotor by hand after loading and check that all sample holders are correctly located before starting a run and before re-starting an interrupted run.

Do not load tubes or vials into sample holders other than those types that have been approved by Genevac Ltd.

Do not use sample holders that have not been supplied with your system without consulting Genevac Service.

2.4 Safe Door Operation

The evaporator door is opened and closed manually but locked automatically by an electric actuator.

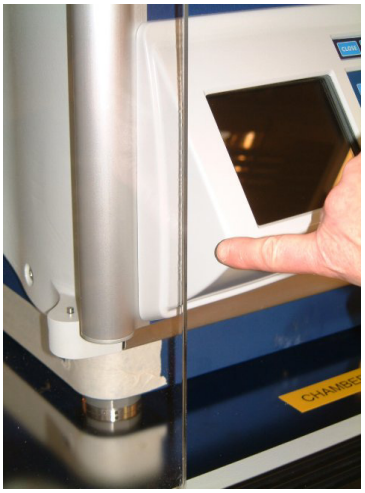
Close and hold the door firmly against the door seal and **press and hold** the **Door Close** switch.

A single audible beep indicates that the door is locked and it is safe to proceed.

A proximity switch will prevent the mechanism from locking if the door is not closed.

When opening or closing the Chamber doors, please be aware that there is a possibility of the user trapping their hand between the Left Hand Chamber Door and the Fume Hood as detailed in the picture below:

Care should also be taken when closing the Fume Hood sliding doors, that the Chamber Doors are closed first so as to reduce the chance of damage being done to both chamber control moulding and fume hood doors, example photo below:



2.5 Limitations of use

Your evaporating system is **unsuitable** for use under the following circumstances:

- With strong mineral acids such as HCl and HBr at all concentrations.
- For use as a pressure vessel.

3 System description and options

The HT-24 is a simple, large capacity, stand-alone, space-saving machine centred around two HT-12 or HT-8 Series II evaporators mounted on a small footprint trolley. Each evaporator maintains its normal capability, remote control and data logging but gives faster processing by allowing independent operation. It is easy to use, reliable, robust and safe.

The HT-24 gives the user the option of simultaneously evaporating 2 different solvents, providing they're not reactive. Other system features are sample integrity, rapid defrosting, and pullout sample shelves for loading/ unloading evaporators.

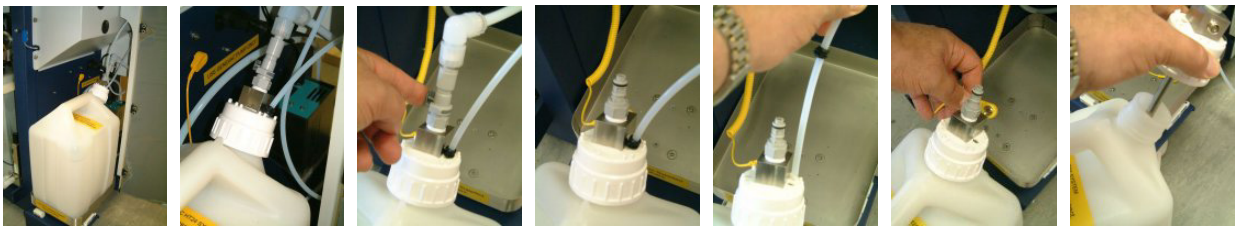
Pullout sample shelves

A single scroll pump is shared between the 2 evaporators by means of a vacuum manifold, which, using smart technology intelligently, switches the pump to each evaporator as required. The pump is a dry vacuum pump, compact in size, driven directly by a single-phase electric motor and air-cooled.

Either evaporator can run independently or both evaporators can run together. Processing can be staggered; one unit working, the other being emptied/ filled. Simultaneous extraction of different solvents is possible, using both evaporators, provided that these do not react with each other within the drain circuit and waste container.

The condensers are capable of chilling, defrosting and draining independently, using smart technology integrated with V2-01 software. Automatic drain valves and drain pumps ensure that solvent is removed from the condenser pots. This will only occur if the Waste Solvent Container that it is fitted to the system has free space available and that the door is shut.

A load cell monitors the level of fluid in the Waste Solvent Container. When the predetermined weight is reached, the Waste Full lamp on the HT-24 control panel will illuminate and will sound an audible alert. The volume of waste solvent in the container varies upon the individual solvents used due to their specific gravity. Emptying the waste solvent container couldn't be any easier, just open the right hand corner door of the HT-24, Lift the container away from the HT-24 (Extended hoses allow this), press in the drain hose self-sealing quick release clip and remove the drain hose adapter. Remove the vent pipe and disconnect the Anti-Static strap using the quick snap fitting. Remove the cap and empty the container. Refitting is the reverse.



Waste Solvent Container - Pump Drain Hose Removal

The evaporators have solid-state case heaters and Coolheat radiant lamps to heat the chamber and samples.

The control of chamber, swing and sample temperature, vacuum ramping rate, chamber pressure, rotor speed is handled by an embedded PC.

IR (Infra Red) Sensor (Non contact temperature measuring) is fitted as standard.

The end user has the facility to auto program run parameters for any (recognised) solvent/mixture entered. These optimised run parameters are highlighted in Cyan on the display screen, when this **Auto Program** facility has been selected.

Recognised Solvent(s) available from drop down menu.

Sample Holder type available from drop down menu.

Lyophilisation (Freeze Drying) available as a Rotor Speed selection on evaporators equipped for this configuration.

Please note: Lyophilisation samples are to be frozen prior to being placed in evaporator.

End of Run Prediction (only available with SampleGuard):

1 Heat Flow.
2 Sample Detection.

The **Run Progress** screen has a fully featured graphical display, providing annotated plots for temperature and pressure (now a log scale).

The control software enables the user to specify and store a library of up to 100 different evaporation profiles in an uncomplicated manner.

Run profiles can also be linked to provide multi stage runs. Up to 100 different profile steps can be linked and iterative loops can also be programmed.

With a maximum single run time of just below 100 hours, the system is extremely flexible to meet every requirement.

Options

Available options include:

- Bump protection (Dri-Pure) on one or both evaporators
- SampleGuard on one or both evaporators
- Extra powerful Coolheat lamps on one or both evaporators
- Low UV lamp lenses on one or both evaporators (not available with high power lamps)
- Built in fume extraction (hood and pipe system)
- Manual Condenser flushing

Data Logging is available independently from each evaporator. Dependent on user hardware, both evaporators could be logged to the same PC. The easy-to-use package provides the data needed for process and quality control - conveniently and efficiently.

Hardware Required**:**

- PC running 'Windows' (95, 98, NT, 2000 or XP).
- Around 5Mbytes of free space on your hard drive.
- Serial Port on PC or USB to Serial Adapter.
- Serial Cable to connect the PC to the Evaporator.

Contact your sales representative for purchase and installation details.

3.1 Scope of delivery and installation

Your HT-24 system has to be commissioned by Genevac personnel.

On delivery, it is advisable to unpack your system at the point of receipt, to ease the movement of the component parts to the point of use.

3.2 Checking the delivery

Check the contents of the delivery as soon as possible against the delivery note and notify Genevac Ltd immediately of any missing or damaged parts. (Refer to section 10 for contact details).

3.3 Arranging commissioning

If your system is to be delivered separately to commissioning, Genevac Ltd will contact you prior to the delivery, to agree a date to commission your system.

3.4 Training

Commissioning will normally include training in the basic operation of the System. Further in house training is recommended to fully exploit the flexibility of the system. Contact your Sales Representative for details.

THE HT-24 EVAPORATOR MUST NOT BE OPERATED BY PERSONNEL WHO LACK THE TRAINING OR PROFESSIONAL EXPERIENCE TO COMPREHEND THE HAZARDS THAT CAN ARISE WHEN USING THE SYSTEM.

Personnel without such training require thorough instruction. These operating instructions should form the basis of this instruction.

3.5 Positioning the evaporator

Refer to the **Technical data** for dimensions and Plan view drawing, also refer to Pre Installation Document.

When in final position ALL four wheels **must** be lifted clear of the floor using the inbuilt jacks.

The back of the system may be placed against a wall, but must have suitable space either side to permit the opening of the doors.

4 Safe loading of rotor – General Document

Genevac are obliged to include the following information in its entirety, irrespective of the system type.

As with a centrifuge, a Genevac centrifugal evaporator must be loaded correctly to remove risk of damage. Failure to correctly load a system can lead to loss of samples, system damage and significant downtime. This guide is intended for new users and also as a reminder for more experienced users. The principles outlined apply to all Genevac evaporators.

The document deals with various aspects of loading:

- Use of correct swings and sample holders
- Observation of weight limits
- Safe loading of sample holders into swings
- Balancing of swings and sample holders
- Good procedural practice

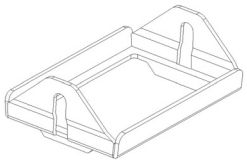
Nomenclature

Firstly, it is important to understand what is meant by some of the terms that will be used in this document.

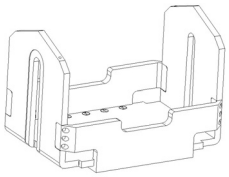
Most Genevac systems feature “swung” rotors.

(Some, however, feature “fixed” rotors, with many angled holes for individual tubes. But this document however is primarily concerned with swung rotors).

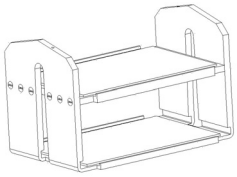
A swung rotor includes a *swing* or *bucket*. Below are drawings of typical swings for HT systems.



Open (or standard)



Side-Bridge



Fast-Stack™ (for microtitre plates)

Each of these swing types lifts straight out of the rotor. On large Mega systems, however (not shown here) the swings are generally fixed in place and cannot be lifted out. Which swing is ideal depends on which *sample holder* is required.

There is a large range of *sample holders* which sit in the swings, into which tubes, vials, beakers or flasks are loaded.

Use of Correct Accessories

Genevac supply a wide range of sample holders to cover a variety of plate, tube, vial or flask formats. Where no holder is available, custom units can be made. In a few cases worldwide, users have developed their own holders and have collaborated with the Genevac R&D department to ensure the holders are suitable and approved for use.

Important properties for a sample holder include:

- Mass within prescribed maximum limit.
- Closely matched mass within a set of holders.
- Correct centre of gravity.
- Good thermal conductivity.
- Correct hole form and size tolerance to prevent tube or vial breakage under centrifugal force.
- For correct use of Sample Guard Probes; refer to SampleGuard - Probe Positions document available at: http://www.genevac.com/applications/downloads1.html

All Genevac holders are designed with these constraints in mind. Other 3rd party accessories may not be.

Generally, apart from microtitre plates, users are advised not to load non-Genevac holders into a system without first checking with Genevac.

It is important that the swings and holders used are suitable for the Genevac system in use. For example, there are some sample holders on sale for the Series II system that might *appear* to fit in a Series I system but which would exceed the weight limitations. (See next section). If in doubt always ask Genevac before running the system.

There are also instances where a sample holder which is perfectly satisfactory (for the tube or vial it is intended for) becomes unsuitable if used with something else, even though it might appear that the alternative tube fits O.K. The Genevac Accessories Brochure indicates for each holder the maximum tube length that the holder is designed to take, and these limits should always be adhered to. (It is available from the website, http://www.genevac.com/brochure/GenevacAccessories.pdf)

Similarly some sample holders are intended for use in a Side-Bridge swing only, not in an Open swing, even though they might appear to fit in the latter. The Accessories Brochure has a note "For use in Side-Bridge Swing" by these items, but if in doubt, ask Genevac.

Some users wish to run Genevac systems using the "Bohdan Miniblock" system as their sample holder. Please note, some (not all) of this range of items significantly exceed the mass limitations of a Genevac system. If you plan to use Bohdan Miniblocks in a Genevac system, please contact Genevac for a list of the relevant weights.

Adherence to Mass Limit

There is a maximum mass that can be loaded onto each position of a Genevac swung rotor, this total includes:

- The swing
- The sample holder
- The tubes or vials
- The sample solutions

Under no circumstances should this be exceeded.

If in doubt what your combined mass total is, load up a full swing and weigh it.

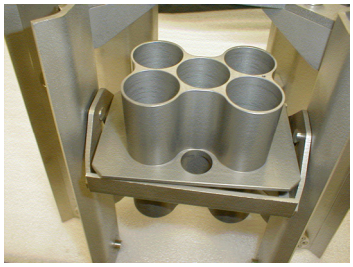
In most cases, with normal solvent volumes, any sample holder currently on sale from Genevac will fall within the mass limit for a Series II system.

Safe loading of sample holders into swings

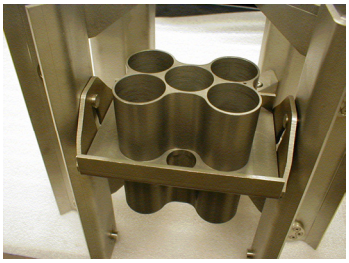
Applicable where both Series I and Series II evaporators are being used within the same laboratory.

There are two ways that it is possible to misload a sample holder into a swing.

One (shown below) is to rotate the sample holder such that it rests on the edges of the swing.



Incorrect – Sample Holder rotated



Correct – Sample Holder well seated

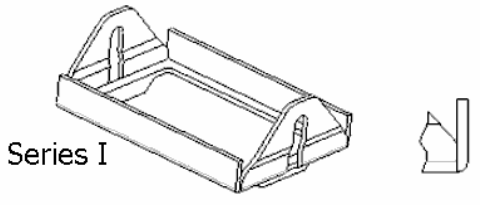
Another mode of misloading is illustrated below.

Incorrect – Sample Holder on edge of swing

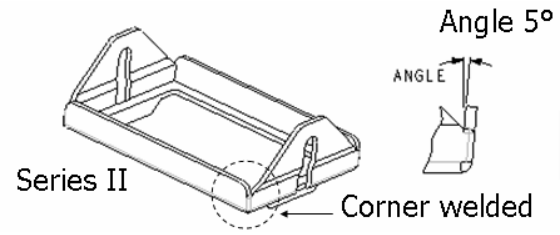
Correct

Both these modes of misloading are possible with an older version of the Open or standard swing but are virtually impossible with the new design of swing, all Series II systems feature the new design of swing. The following illustration shows the difference.

Series I vs Series II Swings:



The older Series I design is easy to distinguish because the corners are not welded.



The newer ("Series II") swing has angled sides that make the incorrect loading illustrated above virtually impossible. Care still has to be taken though.

It also has rounded and welded corners.

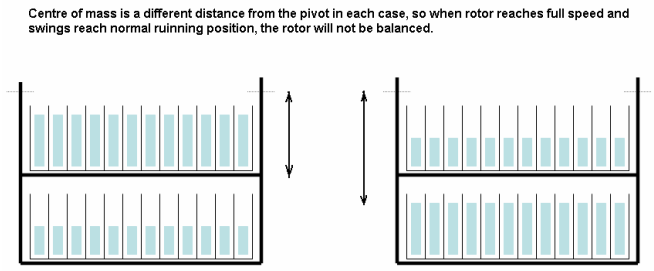
Genevac offer a low cost upgrade to any user who has the old type of swing and who wishes to avoid the possibility of this misloading ever occurring

Balancing of swings and sample holders.

Opposite pairs of swings need to be balanced within specification and that the swings are of the same type and version. Please note that there are several versions of Side Bridge Swings in circulation with a static weight ranging from 375g to 445g. Ensure that swings of the same static weight are positioned diametrically opposite in the rotor; ideally use the same version of swings in all four position of each rotor. Genevac systems have some inbuilt tolerance for imbalance and a system for shutting off if the out-of- balance is unacceptably high but it is advised that the user aims for no more than 10g imbalance between opposite pairs of swings.

Where it is necessary to make "dummy" samples to balance real loads, the balancing load should be of a similar solvent composition. For example, do not balance 200g of 50/50 Water/Acetonitrile with 200g of water, because partway through the run, when the acetonitrile has all gone but the water has barely started evaporating, the system would be 100g imbalanced.

Note that with a system such as the Fast-Stack™ swing, balancing is slightly more complex. Suppose a "Fast-Stack™ Deepwell" swing is used with two 96 well microtitre plates, 2ml per well. (The Fast-Stack™ swing is illustrated on the first page of this document). In one swing, the lower microtitre plate is empty, the upper microtitre plate is full, 1.8mls per well. On the other swing, the reverse is true.


Swings are the same weight but not balanced
Centre of mass is a different distance from the pivot in each case, so when rotor reaches full speed and swings reach normal ruinning position, the rotor will not be balanced.

The two swings now weigh the same, but if placed opposite each other in a system, would not be balanced, because when the swings rotated to their operating attitude, the centre of mass of one is at a different radius to that of the other.

This effect becomes very significant when balancing multi level swings in large Mega systems.

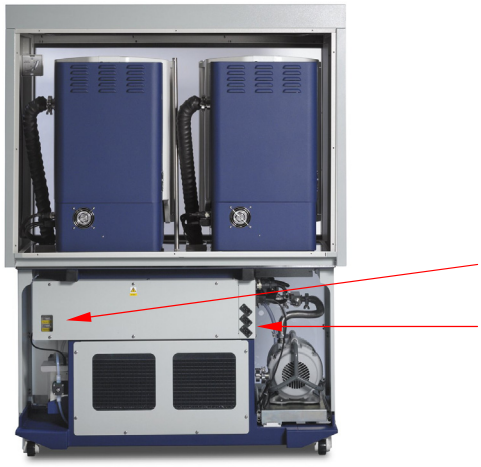
It is also preferable not to run with only two swings out of four present on any one level of the rotor. If there are only two swings' worth of samples, you should still load swings and empty sample holders in the other positions. This ensures the rotor is evenly loaded.

Good procedural practice

Finally, there are a few general rules for safe operation of a system:

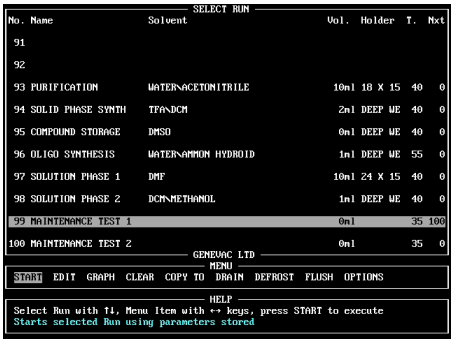
- Ensure only users familiar with all the issues outlined in this document are permitted to operate the equipment.
- Only load swings and sample holders approved by Genevac.
- System should be loaded and started by the same person.
- Never leave system unevenly loaded and close the door. Someone may start it.
- Never start, or restart a system without checking it is evenly loaded, all sample holders are correctly seated, all swings are swinging freely.
- Refer to SampleGuard - Probe Positions document available at: http://www.genevac.com/applications/downloads1.html for correct use of Sample Guard Probes.

Misloading may result in damage to samples and the machine, and could void the warranty.



Rear Fume Hood panel removed for clarity

Program Name: Automated Evaporator Controller - Series II
Copyright: Genevac Ltd
Version: 02.01
Build: Jun 24 2003 09:02:40
Press START key to start up evaporator...


SELECT RUN
No. Name Solvent Vol. Holder T. Nxt
91
92
93 PURIFICATION WATER\ACETONITRILE 10ml 18 X 15 40 0
94 SOLID PHASE SYNTH TFA\DCM 2ml DEEP WE 40 0
95 COMPOUND STORAGE DMSO 0ml DEEP WE 40 0
96 OLIGO SYNTHESIS WATER\AMMOM HYDROID 1ml DEEP WE 55 0
97 SOLUTION PHASE 1 DMF 10ml 24 X 15 40 0
98 SOLUTION PHASE 2 DCM\METHANOL 1ml DEEP WE 40 0
99 MAINTENANCE TEST 1 0ml 35 100
100 MAINTENANCE TEST 2 0ml 35 0
GENEVAC LTD
MENU
START EDIT GRAPH CLEAR COPY TO DRAIN DEFROST FLUSH OPTIONS
HELP
Select Run with ↑↓, Menu Item with ↔ keys, press START to execute
Starts selected Run using parameters stored

5 Getting started

The following notes describe the basic start up, set up and run instructions for your HT-24 evaporating system.

5.1 Checks prior to power up

Ensure that Data cables are connected if required.

Ensure that the 3 mains leads are connected to the rear of the system.

Ensure mains supplies are switched on at source.

Ensure that each evaporator **ON/OFF** switch is set to **ON.** These can be permanently left **ON** as the HT-24 controls power distribution.

If already pressed, ensure **EMERGENCY STOP** button has been reset.

THE EMERGENCY STOP BUTTON IS NOT TO BE USED TO SHUT DOWN THE SYSTEMS ON A ROUTINE BASIS.

5.2 How to switch on the evaporator(s)

Press the Green power **ON** button, the **POWER ON** LED will illuminate.

Both systems will power up.

The screen on both systems will display the **Software Control** screen.

Select the system that you want to use.

Press the appropriate **OPEN CHAMBER** button or use the keypad on the evaporator.

Load your samples following the Safe Loading guide (Section 4 of this manual).

Close and hold the door firmly against the door seal and press and hold the Door Close switch.

Press the **START** key on the keyboard to access the **Select Run** screen.

The **Select Run** screen will load up at the last run that was used.

A series of runs have been preloaded from RUN 51 to RUN 100 inclusive.

Runs 51 to 98 provide a range of Standard Configurations, details on Page 20.

Runs 99 and 100 are only for use by engineers for Maintenance/Diagnostics.

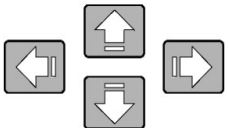
5.3 Using the keypad

The Series II keyboard controls and displays have been designed for ease and simplicity in use.

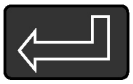
The keyboard has the most used function keys on the left hand side.

The right side illuminates when the **RUN DATA** screen is accessed or user input data is required.

The **START** and **STOP** keys start and stop a selected run.



The **cursor direction keys** move you around the screen in the direction of the arrows.



The **ENTER** key is used to 'open' and 'close' a field on the **Run Data** screen when inputting or amending data.

Note that the **START** key also acts as an **ENTER** key when the keyboard is not illuminated.

MENU

Operating the **MENU** key displays the **USER MENU** screen ***only*** when the rotor is not spinning and the chamber is vented.

DISPLAY

Operating the **DISPLAY** key displays the **RUN LOG** screen ***only*** when a run is in progress or has finished.

SETTINGS

Operating the **SETTINGS** key displays the **RUN DATA** screen ***only*** for the selected run.

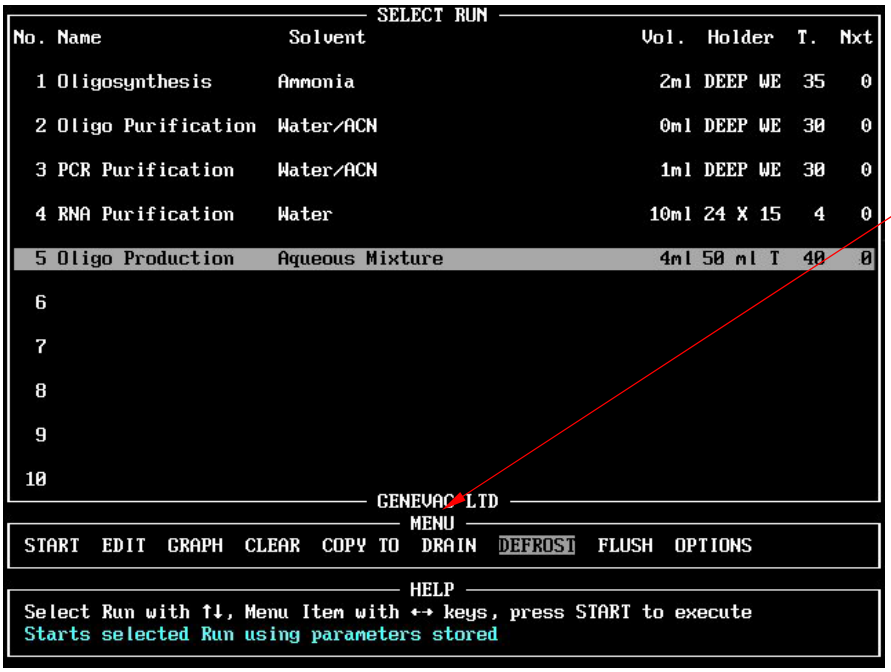
Note that the **RUN DATA** screen can also be accessed from the menu **VIEW/EDIT DETAILS** option on the **SELECT RUN** screen when a run is ***not*** in progress.

The following notes describe the function of each screen and provide an explanation of the prompts displayed.

5.4 What the screens do

There are three main control screens.

The **SELECT RUN** screen lists the library of evaporation run profiles you can choose. This screen has the capacity to store 100 different run profiles, from which you can select a particular run or set of runs. The screen is accessed after switching on the pump and evaporator and by pressing the **START** key on the keyboard.


SELECT RUN
No. Name Solvent Vol. Holder T. Nxt
1 Oligosynthesis Ammonia 2ml DEEP WE 35 0
2 Oligo Purification Water/ACN 0ml DEEP WE 30 0
3 PCR Purification Water/ACN 1ml DEEP WE 30 0
4 RNA Purification Water 10ml 24 X 15 4 0
5 Oligo Production Aqueous Mixture 4ml 50 ml T 40 0
6
7
8
9
10
GENEVAC LTD
MENU
START EDIT GRAPH CLEAR COPY TO DRAIN DEFROST FLUSH OPTIONS
HELP
Select Run with ↑↓, Menu Item with ↔ keys, press START to execute
Starts selected Run using parameters stored

- You store and select your runs on these screens.
- Use the UP and DOWN cursor keys to move between profiles.

By moving across the horizontal menu bar, using left and right cursor keys.

- You can **START** a run.
- You can **VIEW** and **EDIT** a profile.
- You can **CLEAR** a profile.
- You can **COPY** a profile.
- Start to **DRAIN**.
- Start to **DEFROST**.
- Start to **FLUSH**. (If Option Fitted)
- Adjust your **OPTIONS**.

The 100 profiles are shown on this and nine other screens.

The other screens can be accessed quickly by moving the cursor down to the last entry on the page and pressing the down cursor key.

This will take you to the last entry on the next page. Alternatively, use the up cursor key.

If the evaporator is left on the run select screen for 2 minutes or more then the following status message will appear across the bottom of the screen:

This informs you of the Status of the condenser for that particular evaporator, useful where multi-users are involved. Any key press will clear this message.

Pre-programmed Runs (SampleGuard option only)

Providing that your HT-24 has the SampleGuard option fitted to the chambers, it will have been loaded with a number of pre-programmed evaporation runs. The runs can be found located at runs 51 to 60 of the RUN selection screen. Desired runs can be copied to the top page so as to be readily available, using the "copy to" function. Methods 61 through to 98 are all associated with these pre-programmed methods, and methods 99 and 100 are for use by Genevac service engineers, please do not alter them.

The pre-programmed methods have been designed to cover a group of solvents, such as high boiling point solvents. The table below provides a guide to aid correct run selection. Each method has been programmed to be used with a particular group of solvents, therefore, it may be possible to program a more efficient method for just one of those solvents. If you regularly use a single solvent or solvent mixture, then please contact your Genevac representative, or applications@genevac.com for assistance programming a suitable method.

These methods have been designed to make use of all the appropriate features of the system to provide the most optimal evaporation conditions. All methods make use of the automatic end of method detection feature, so that no times need be set, the system will stop when all the samples are dry. Each method has a venting procedure linked to the end of the evaporation process, to help remove residual vapours from the chamber.

When using these preset programs, they **will only function correctly** if Sample Guard probe #1 is placed into the aluminium sample holder block or fast stack swing.

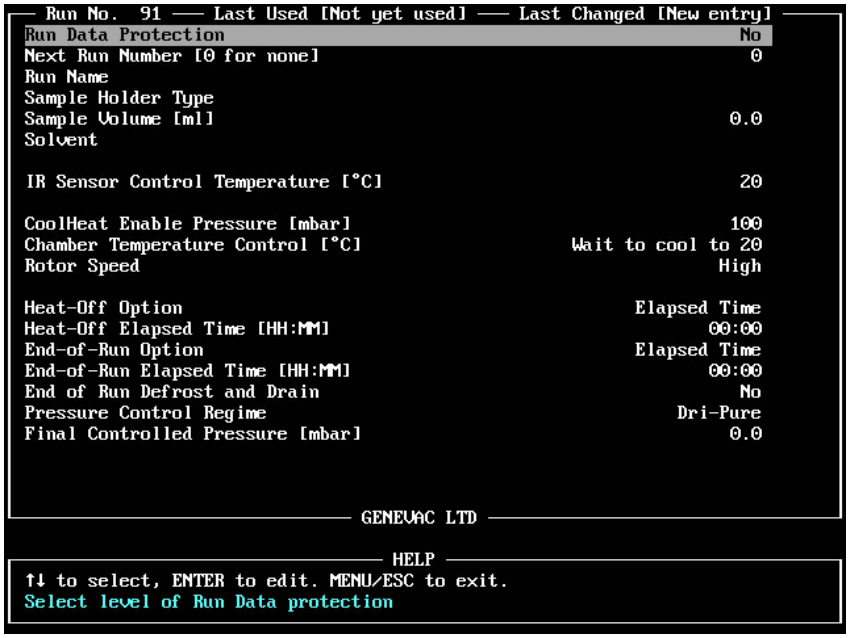
Run Number	Name	BP Range	Solvent Examples	Application
51	Volatiles - not DCM	60-90°C	Ethyl Acetate or Methanol	Single volatile solvents with no risk of bumping
52	Very Volatile & DCM	40-90°C	DCM (Methylene Chloride) or Chloroform	Volatile solvent mixtures, and DCM (Methylene chloride), where risk of bumping is high
53	Medium BP Solvents	90-155°C	DMF or Toluene	Medium bp solvent or mixture of medium bp solvents
54	Med BP & Volatile	40-155°C	DMF & DCM (Methylene Chloride)	Mixtures of medium and volatile solvents with high risk of bumping
55	Pre-heat Chamber for High BP solvents	-	No solvents should be present	Rapid pre-heat of chamber before a high bp solvent run, swings and samples **MUST** be removed before this method is used.
56	High bp 140+	140-190°C	DMF, DMAc, DMSO	High bp solvents
57	Very High BP Solvents	190°C +	NMP, DMI	Very high bp solvents
58	HPLC Fractions	-	Water & Acetonitrile or Methanol	HPLC fractions
59	Aqueous only	100°C	Water	Water only
60	Remove stubborn solvents	-	Any	Drying samples, which have not been fully dried using another method. The condenser **MUST** be empty before this method is used

Each line on the **SELECT RUN** screen is generated from the **RUN DATA** screen.

When the chamber is vented and the rotor stationary, this screen is accessed by selecting **EDIT** at the foot of the **SELECT RUN** screen and pressing **START**.

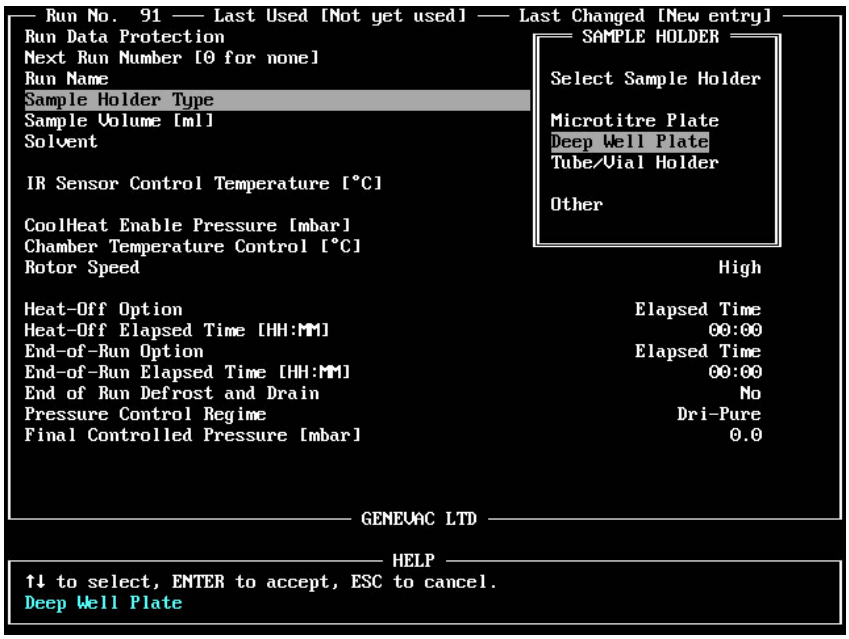
When the system is running, the **RUN DATA** screen can be accessed directly by pressing the **SETTINGS** key.

SETTINGS


Run No. 91 — Last Used [Not yet used] — Last Changed [New entry]
Run Data Protection No
Next Run Number [0 for none] 0
Run Name
Sample Holder Type
Sample Volume [ml] 0.0
Solvent
IR Sensor Control Temperature [°C] 20
CoolHeat Enable Pressure [mbar] 100
Chamber Temperature Control [°C] Wait to cool to 20
Rotor Speed High
Heat-Off Option Elapsed Time
Heat-Off Elapsed Time [HH:MM] 00:00
End-of-Run Option Elapsed Time
End-of-Run Elapsed Time [HH:MM] 00:00
End of Run Defrost and Drain No
Pressure Control Regime Dri-Pure
Final Controlled Pressure [mbar] 0.0
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Select level of Run Data protection

- Use the UP and DOWN cursor keys to move between fields.
- Press ENTER to 'open' a field, make the entry and press ENTER again to 'close' the field.
- During a run, you access this screen by pressing the SETTINGS key.
- You can edit any parameter during a run in this way.
- You can set **Run Data Protection** to protect your data (see below).

Toggle between Yes, No and Password. Password requires you entering a personal 4 digit code. If you forget your password DataLogger can retrieve the run details including your password. There are no password requirements when using DataLogger, existing password protected runs can be overwritten.

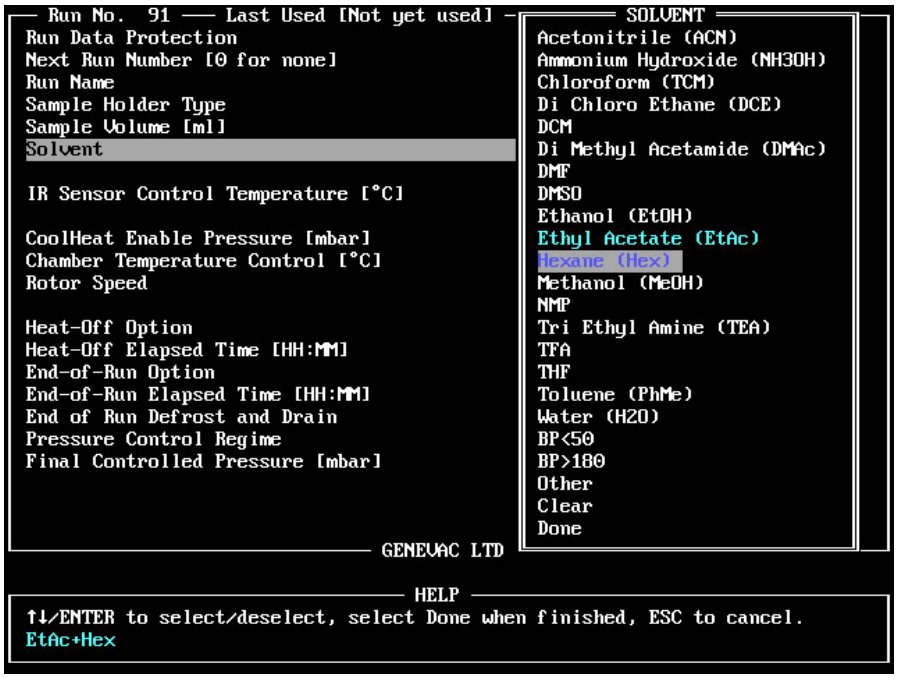


Sample Holder Type

- When selected you are presented with the SAMPLE HOLDER menu.
- Use Cursor keys to move up and down.
- Press ENTER to select.
- Select your sample holder type or if not defined, select **Other** and enter the details.

Sample Volume

- Select and enter value(s).



Solvent

When you select this field you are given a list of solvent types that have already been programmed into the evaporator.

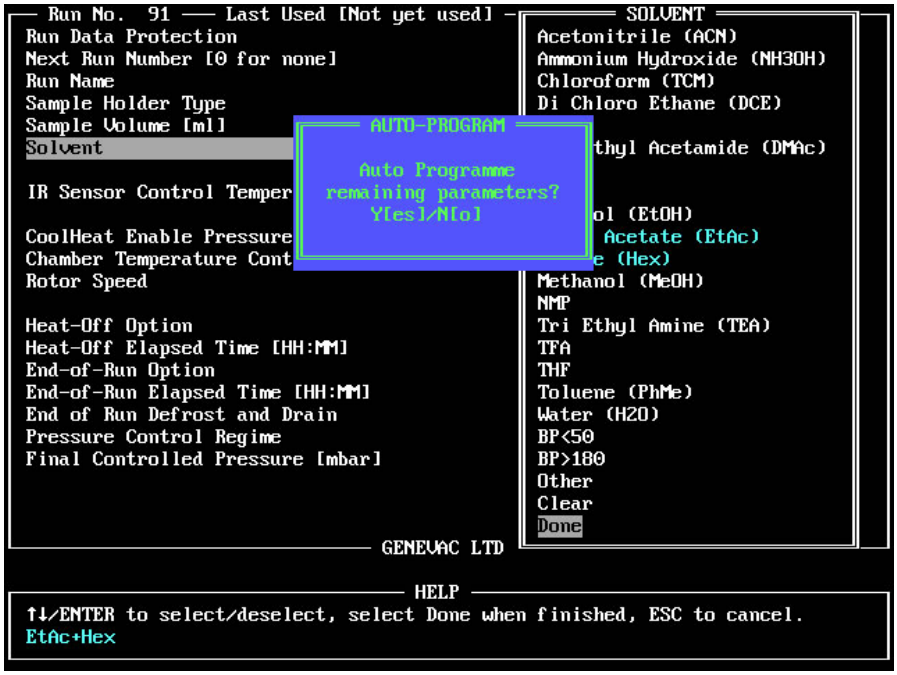
Use cursor keys to move up and down.

Press ENTER key to select (Highlighted in blue).

Please note that the solvent(s) that you have selected from the menu appear in the bottom left corner of the screen.

Select **Done** when finished.

Once your selection has been made you are now given an option to **Auto Program** the remaining run parameters.

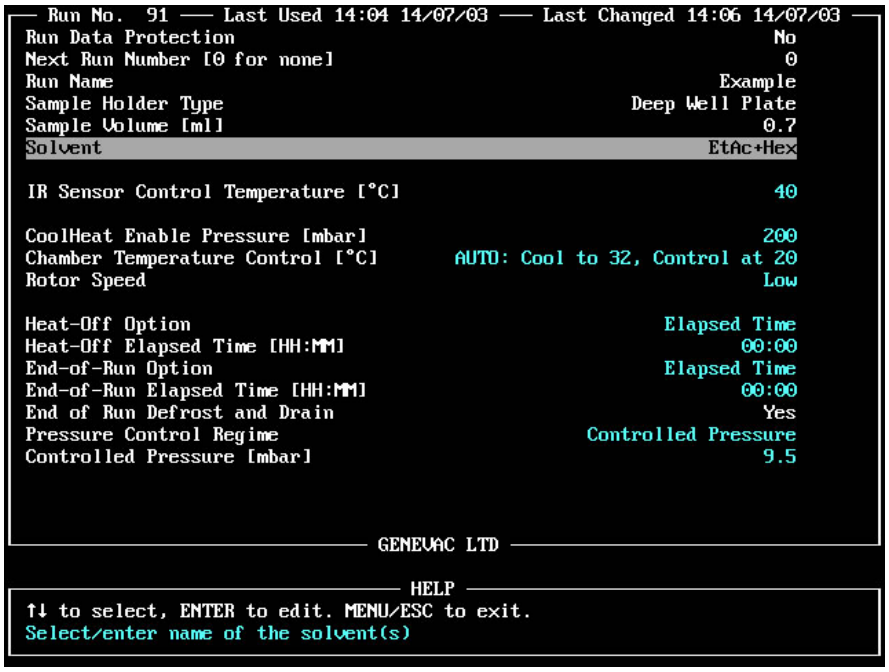


Press **Y** to accept **Auto Program**.

If you have entered an unrecognised solvent by selecting **Other** from the solvent menu, you will not be presented with the option to **Auto Program**.

REFER TO THE TABLE ON PAGE 8 FOR THE SOLVENTS THAT HAVE BEEN CLEARED FOR USE IN AN HT-24.

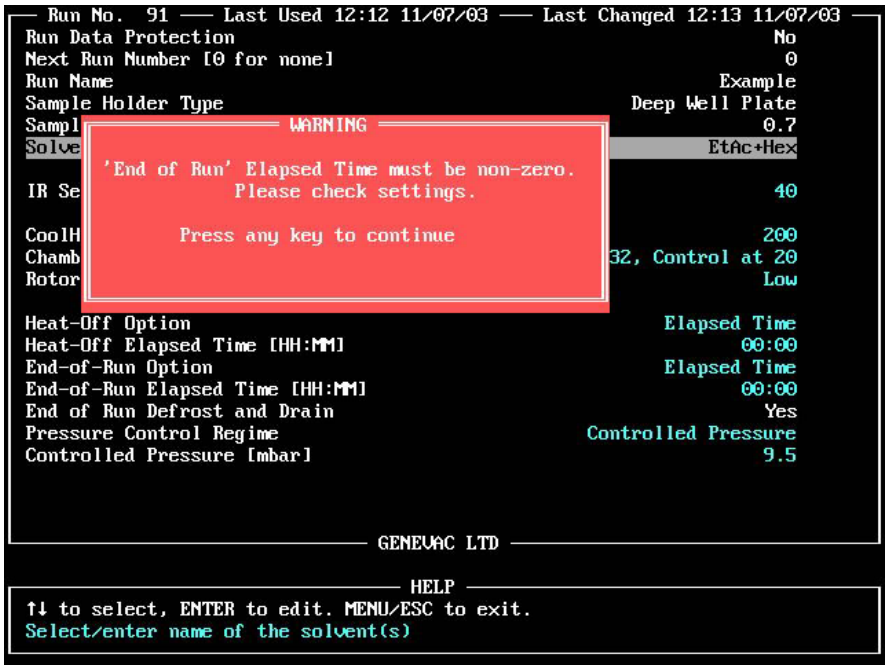
HCl, Thionyl Chloride Or Di Ethyl Ether Compatibilities Are Not Available.


Run No. 91 — Last Used 14:04 14/07/03 — Last Changed 14:06 14/07/03
Run Data Protection No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.7
Solvent EtAc+Hex
IR Sensor Control Temperature [°C] 40
CoolHeat Enable Pressure [mbar] 200
Chamber Temperature Control [°C] AUTO: Cool to 32, Control at 20
Rotor Speed Low
Heat-Off Option Elapsed Time
Heat-Off Elapsed Time [HH:MM] 00:00
End-of-Run Option Elapsed Time
End-of-Run Elapsed Time [HH:MM] 00:00
End of Run Defrost and Drain Yes
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 9.5
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Select/enter name of the solvent(s)

With **Auto Program Y[es]** selected.

The screen will now display the **Auto Programmed** data in Cyan (Light Blue).

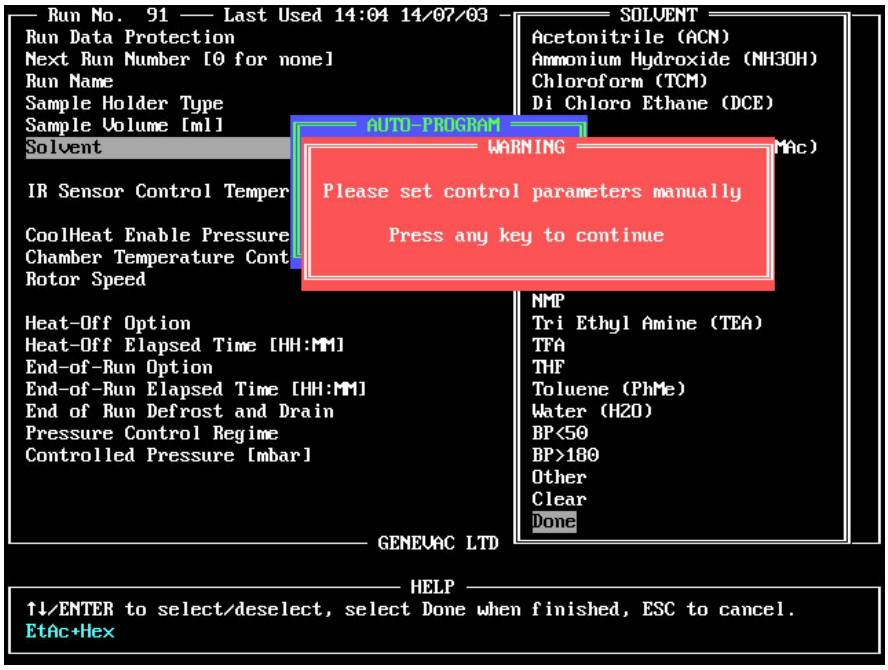
With **IR Sensor Temperature Control** only **Elapsed Time** is available as a **Heat-Off Option**. So you will need to manually enter the values for **Heat-Off Elapsed Time** and **End of Run Elapsed Time**.


Run No. 91 — Last Used 12:12 11/07/03 — Last Changed 12:13 11/07/03
Run Data Protection No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
WARNING
'End of Run' Elapsed Time must be non-zero.
Please check settings.
Press any key to continue
Heat-Off Option Elapsed Time
Heat-Off Elapsed Time [HH:MM] 00:00
End-of-Run Option Elapsed Time
End-of-Run Elapsed Time [HH:MM] 00:00
End of Run Defrost and Drain Yes
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 9.5
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Select/enter name of the solvent(s)

If you try to save the run without setting these values then you will get a warning on the screen.

You can also set the automatic **End of Run Defrost and Drain** option here. Only available between linked runs and is typically used to remove mixed solvents.

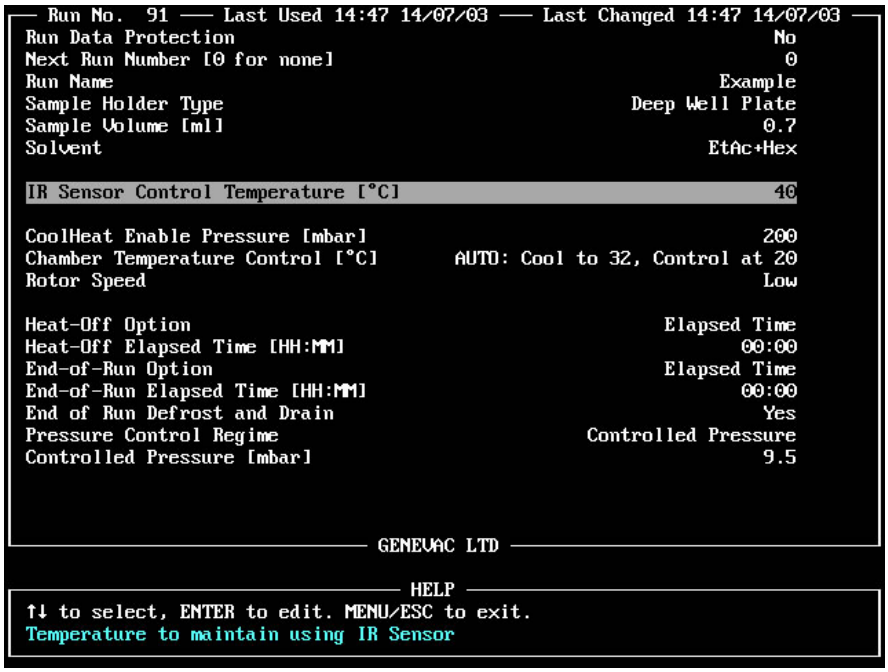
After setting the values save the Run and continue.



If you did not select **Auto Program** or were not given the option, due to inputting an unrecognised solvent, then you will be presented with this screen.

If editing an existing run, parameters will remain as previous settings.

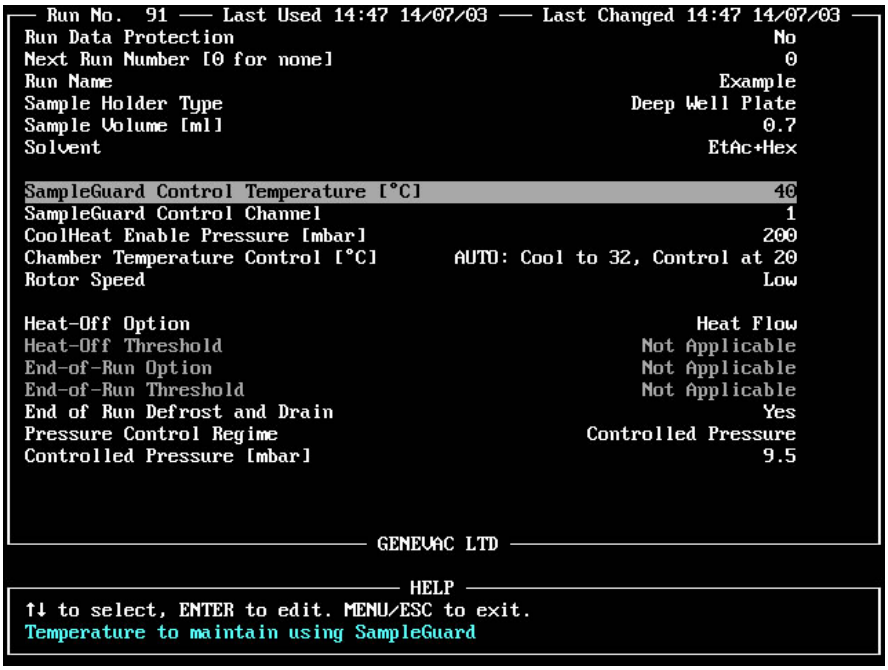
If creating a new run, parameters will be set to safe default settings.


Run No. 91 Last Used 14:47 14/07/03 Last Changed 14:47 14/07/03
Run Data Protection No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.7
Solvent EtAc+Hex
IR Sensor Control Temperature [°C] 40
CoolHeat Enable Pressure [mbar] 200
Chamber Temperature Control [°C] AUTO: Cool to 32, Control at 20
Rotor Speed Low
Heat-Off Option Elapsed Time
Heat-Off Elapsed Time [HH:MM] 00:00
End-of-Run Option Elapsed Time
End-of-Run Elapsed Time [HH:MM] 00:00
End of Run Defrost and Drain Yes
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 9.5
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Temperature to maintain using IR Sensor

IR Sensor Control Temperature

If you have an **IR Sensor** you must set **IR Sensor Control Temperature** within the range of -20 to 70°C.

If your evaporator is fitted with **SampleGuard** then this option will not be available but 2 other options **SampleGuard Control Temperature** and **SampleGuard Control Channel** will be.


Run No. 91 — Last Used 14:47 14/07/03 — Last Changed 14:47 14/07/03
Run Data Protection No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.7
Solvent EtAc+Hex
SampleGuard Control Temperature [°C] 40
SampleGuard Control Channel 1
CoolHeat Enable Pressure [mbar] 200
Chamber Temperature Control [°C] AUTO: Cool to 32, Control at 20
Rotor Speed Low
Heat-Off Option Heat Flow
Heat-Off Threshold Not Applicable
End-of-Run Option Not Applicable
End-of-Run Threshold Not Applicable
End of Run Defrost and Drain Yes
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 9.5
GENEVAC LTD
HELP
↑↓ to select, ENTER to edit. MENU/ESC to exit.
Temperature to maintain using SampleGuard

SampleGuard Control Temperature

Set within the range of -20 to 70°C.

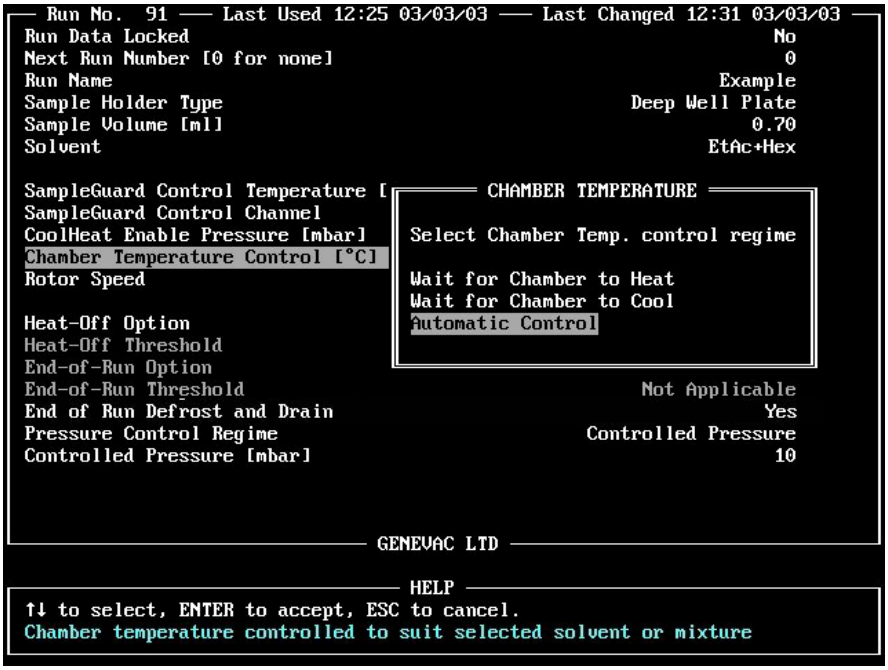
SampleGuard Control Channel

Channel 1 in Swing or Sample Holder.

Channel 2 in Sample.

Coolheat Enable Pressure

Set within the range of 5–400 mbar.


Run No. 91 — Last Used 12:25 03/03/03 — Last Changed 12:31 03/03/03
Run Data Locked No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.70
Solvent EtAc+Hex
SampleGuard Control Temperature [
SampleGuard Control Channel
CoolHeat Enable Pressure [mbar]
Chamber Temperature Control [°C]
Rotor Speed
Heat-Off Option
Heat-Off Threshold
End-of-Run Option
End-of-Run Threshold Not Applicable
End of Run Defrost and Drain Yes
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 10
CHAMBER TEMPERATURE
Select Chamber Temp. control regime
Wait for Chamber to Heat
Wait for Chamber to Cool
Automatic Control
GENEVAC LTD
HELP
↑↓ to select, ENTER to accept, ESC to cancel.
Chamber temperature controlled to suit selected solvent or mixture

Chamber Temperature Control

There are 3 options available:

Wait for Chamber to Heat

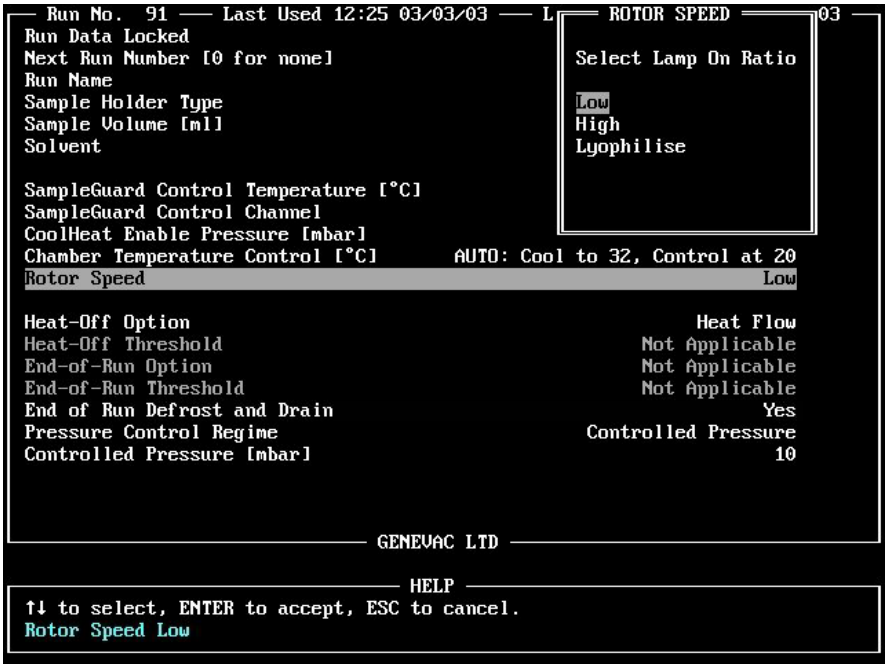
Range from 0°C to 45°C.

Wait for Chamber to Cool

Range from 0°C to 45°C.

Automatic Control

Temperature is automatically set to an optimised figure for the recognised solvent / mixture selected.



Rotor Speed

There are 3 options available:

Low

Rotor speed applies nominally 300 G.

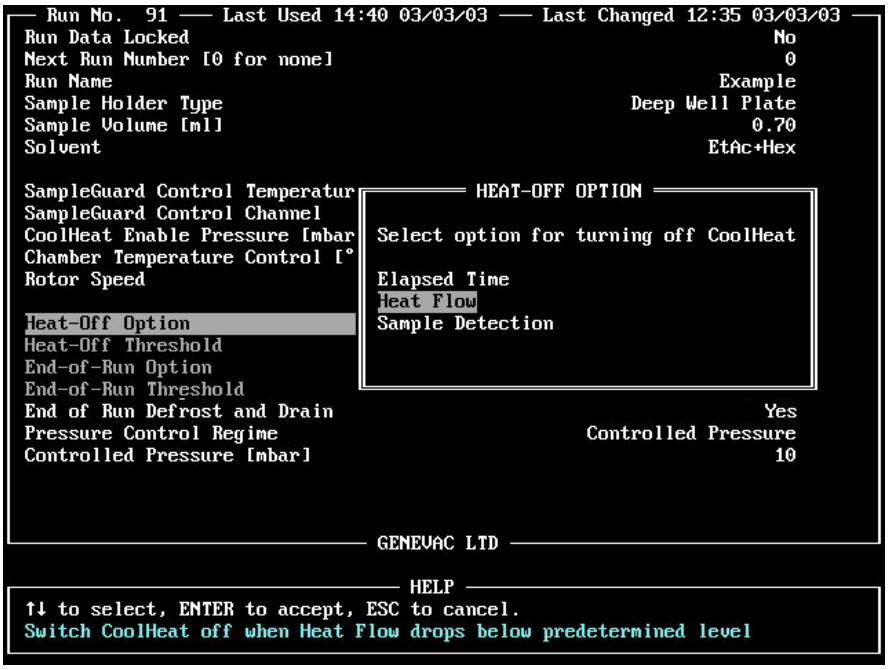
High

Rotor speed applies nominally 500 G.

Lyophilise

Rotor speed = 500 rpm.

SampleGuard and Coolheat are not available.


Run No. 91 Last Used 14:40 03/03/03 Last Changed 12:35 03/03/03
Run Data Locked No
Next Run Number [0 for none] 0
Run Name Example
Sample Holder Type Deep Well Plate
Sample Volume [ml] 0.70
Solvent EtAc+Hex
SampleGuard Control Temperatur
SampleGuard Control Channel
CoolHeat Enable Pressure [mbar
Chamber Temperature Control [°
Rotor Speed
Heat-Off Option
Heat-Off Threshold
End-of-Run Option
End-of-Run Threshold
End of Run Defrost and Drain Yes
Pressure Control Regime Controlled Pressure
Controlled Pressure [mbar] 10
HEAT-OFF OPTION
Select option for turning off CoolHeat
Elapsed Time
Heat Flow
Sample Detection
GENEVAC LTD
HELP
↑↓ to select, ENTER to accept, ESC to cancel.
Switch CoolHeat off when Heat Flow drops below predetermined level

Heat-Off Option

There are 3 options available:

Elapsed Time

You must set the values for “Heat-Off Elapsed Time” and “End of Run Elapsed Time”.

Heat Flow

Automatically detects dryness by monitoring the rate at which the solvent is evaporating.

Low solvent loading or if the lamps are turned off may cause Heat Flow to fail.

If failure occurs, select one of the other two options.

Sample Detection

Monitors the temperature difference between the 2 SampleGuard channels.

ATTENTION:

THE 3 “HEAT OFF” OPTIONS ARE ONLY AVAILABLE IF YOUR EVAPORATOR HAS SAMPLEGUARD FITTED.

IF YOUR EVAPORATOR HAS “IR SENSOR” THEN ONLY “ELAPSED TIME” IS AVAILABLE.

5.5 Starting a run

Select the run that you require from the list.

Select **START** from the menu and press **START** button.

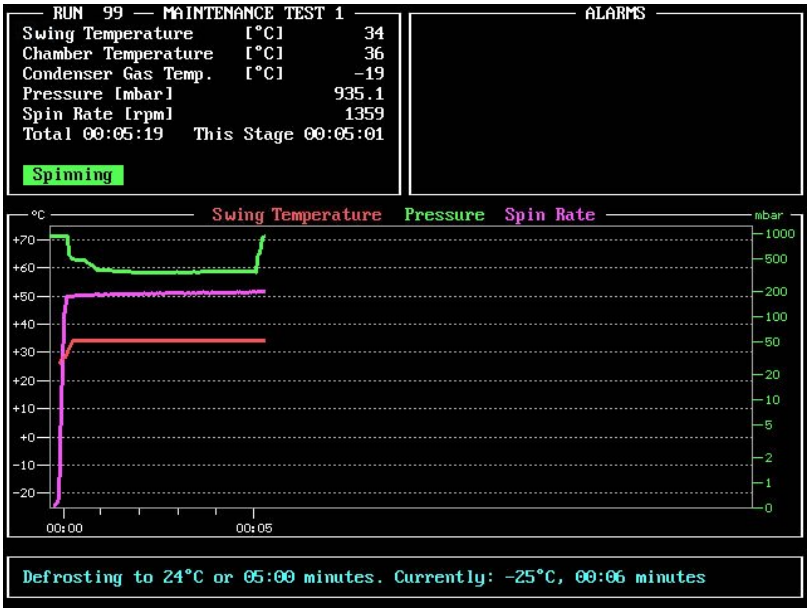
You will get an advisory message as shown below (This is can be turned off in the **OPTIONS** menu):

After ensuring that you have satisfied the requirements:

Press START to continue, or STOP to shutdown.

5.6 Linked runs

If you have used the **Next Run** option and set the **End of Run Defrost and Drain** option to **Yes** then the following message will be displayed at the bottom of the screen. Note: plot is paused during this time.



5.7 During a run

The main section of the **RUN LOG** screen, gives a graphical display of the real time changes in chamber pressure, spin rate, sample and sample holder temperatures.

During the initial pump down, as solvent starts to evaporate, you may notice that the pressure indicated on the graph fluctuates, this is quite normal due to the way that the evaporators and the scroll pump interact. When the pump switches between evaporators a slight pressure rise may occur during the 30 second wait period, this is due to the evaporation of the solvent(s).

IR Sensor

With an evaporator with IR Sensor fitted, the top left hand section displays the current sample temperature, the chamber temperature, the condenser temperature, the chamber pressure, the total time elapsed and the stage time elapsed if linked runs are being undertaken.

- The RUN LOG screen displays the real time events.
- The top left block gives current values.
- The top right block displays any alarms.
- The block at the foot of the screen displays the current status of the system and Instructions.
- Pressure is plotted on log scale.
- Press STOP to terminate a run at any time.

When run enters final drying period the display changes to indicate the time left to **End of Run** or if linked runs **End of Stage**.

Press the **DISPLAY** key during a run to return to the **RUN LOG** screen.

Operating the **STOP** key at any time during a run will terminate the run.

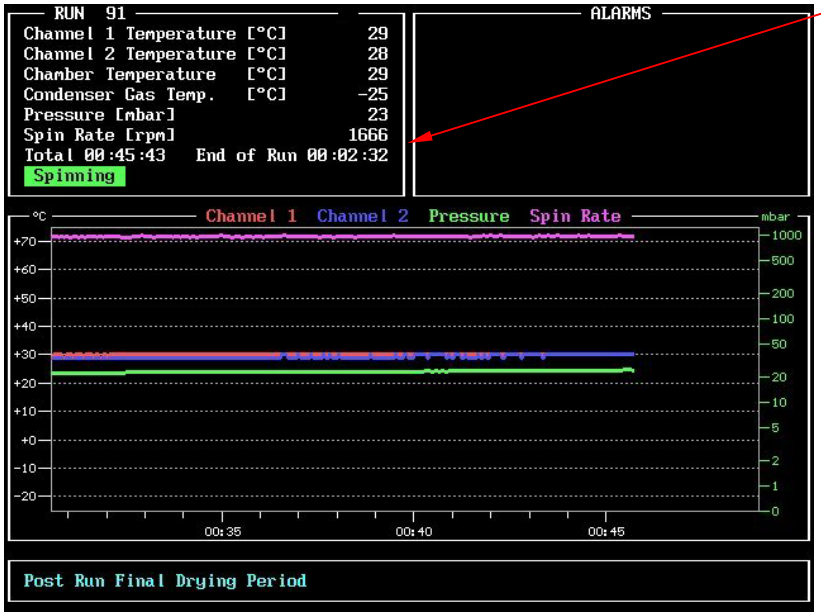
The chamber will vent and the rotor will start to spin down.

You will not be able to open the chamber until the chamber has reached atmospheric pressure and the rotor has stopped spinning.

When the chamber has vented and the rotor stopped, you will be given this **STATUS** prompt.

SampleGuard

With an evaporator with SampleGuard fitted, the top left hand section displays the current temperatures of channels 1 and 2, the chamber temperature, the condenser temperature, the chamber pressure, the total time elapsed and the stage time elapsed if linked runs are being undertaken.



- The RUN LOG screen displays the real time events.
- The top left block gives current values.
- The top right block displays any alarms.
- The block at the foot of the screen displays the current status of the system and Instructions.
- Pressure is plotted on log scale.
- Press STOP to terminate a run at any time.

When run enters final drying period the display changes to indicate the time left to **End of Run** or if linked runs **End of Stage**.

Press the **DISPLAY** key during a run to return to the **RUN LOG** screen.

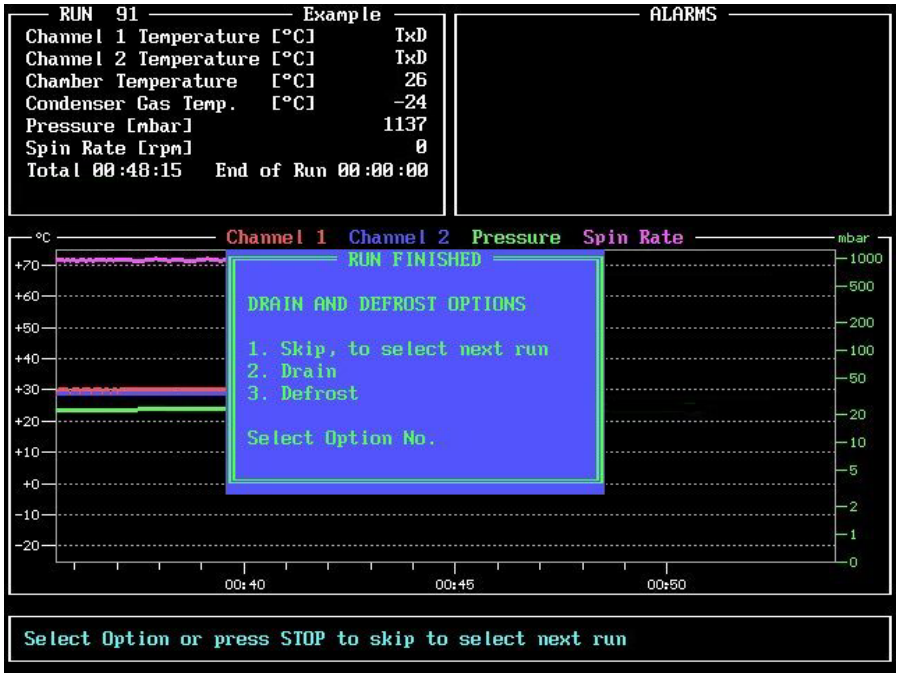
Operating the **STOP** key at any time during a run will terminate the run.

The chamber will vent and the rotor will start to spin down.

You will not be able to open the chamber until the chamber has reached atmospheric pressure and the rotor has stopped spinning.

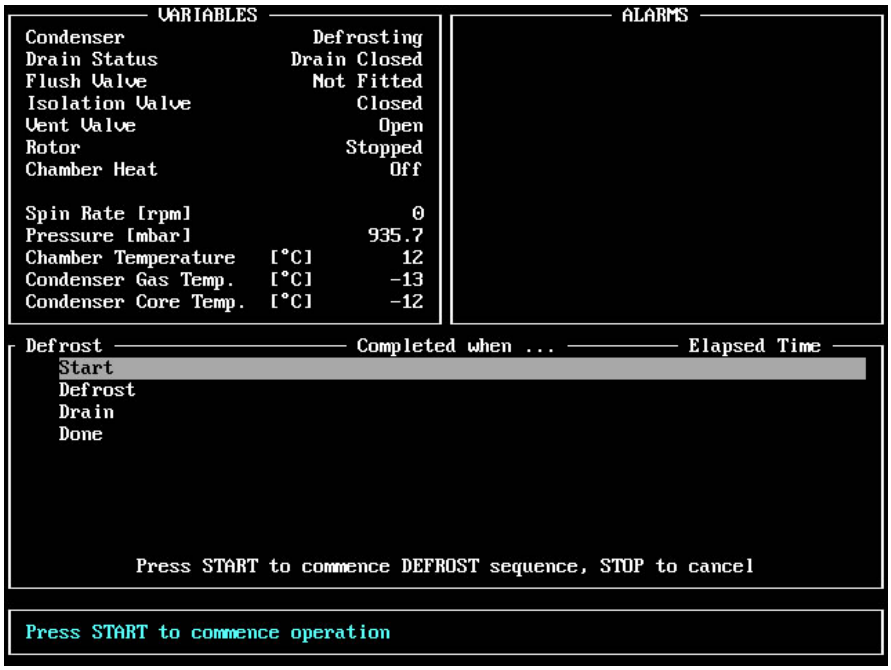
When the chamber has vented and the rotor stopped, you will be given this **STATUS** prompt.

When the run is finished, after pressing a key, the following screen is displayed.



Select the **DRAIN or DEFROST OPERATIONS** option using the numeric keys.

To access from the main menu select **DRAIN or DEFROST** and press **ENTER**.



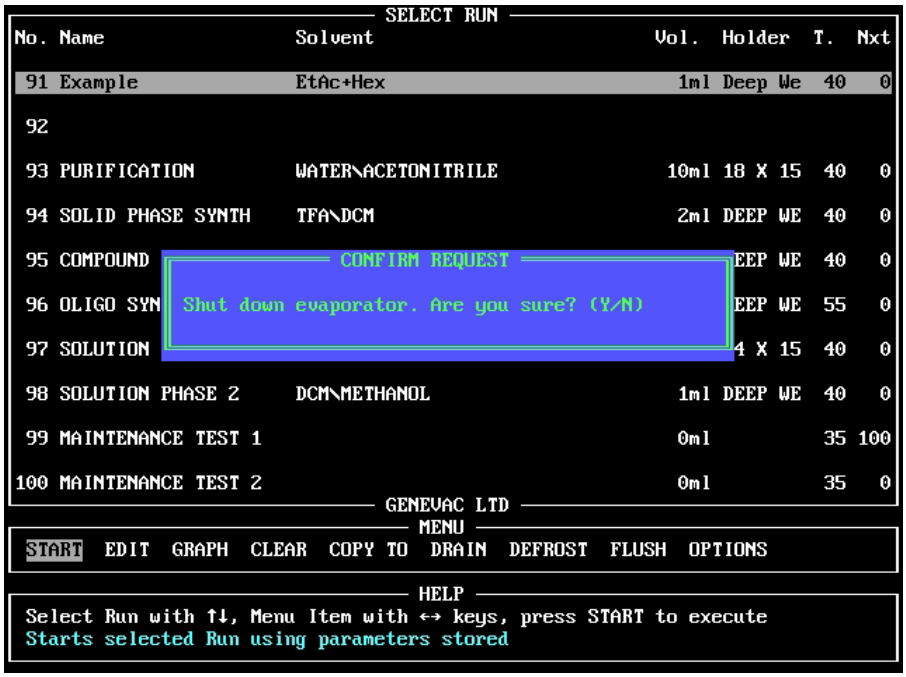
- With the DEFROST CYCLE highlighted, press ENTER to start the defrost cycle.
- This will automatically initiate defrosting.
- Drain the condenser after every run and at the end of the day.
- A defrosted and drained condenser will operate more efficiently.
- Periodically check the level of solvent in the waste container. The light on the main control panel will illuminate when the container is full.

Screens similar to this are also displayed for **DRAIN** and, if fitted, the **FLUSH** option.

Select option **1. Skip, to select next run**.

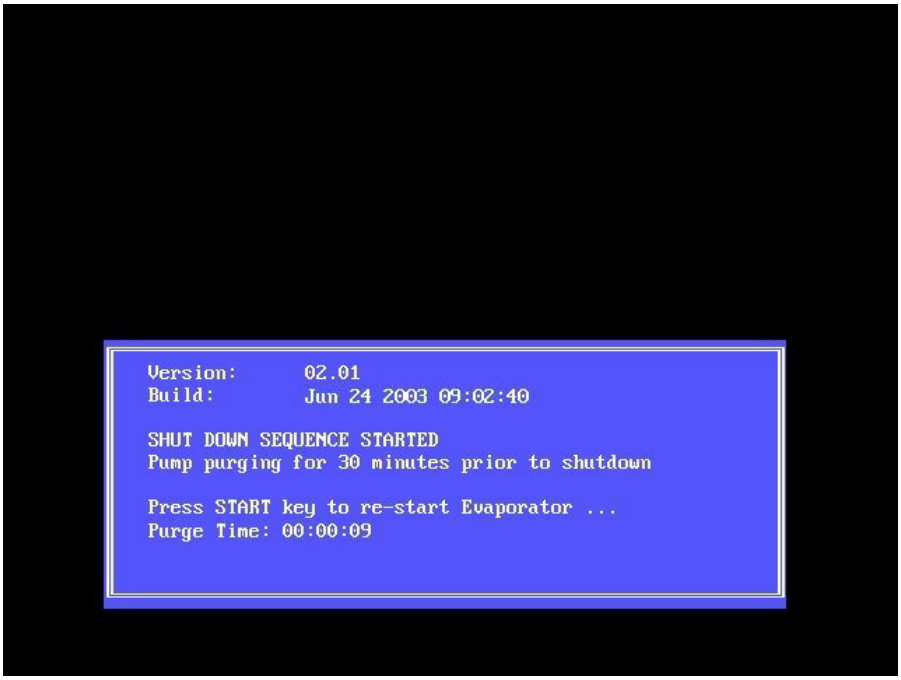
Defrost and Drain must be carried out at least once a week (to prevent pot freezing / clogging).

If you wish to end the work session on the system, go to the **Select Run** screen and press **STOP**.


SELECT RUN
No. Name Solvent Vol. Holder T. Nxt
91 Example EtAc+Hex 1ml Deep We 40 0
92
93 PURIFICATION WATER\ACETONITRILE 10ml 18 X 15 40 0
94 SOLID PHASE SYNTH TFA\DCM 2ml DEEP WE 40 0
95 COMPOUND EEP WE 40 0
96 OLIGO SYN EEP WE 55 0
97 SOLUTION 4 X 15 40 0
98 SOLUTION PHASE 2 DCM\METHANOL 1ml DEEP WE 40 0
99 MAINTENANCE TEST 1 0ml 35 100
100 MAINTENANCE TEST 2 0ml 35 0
CONFIRM REQUEST
Shut down evaporator. Are you sure? (Y/N)
GENEVAC LTD
MENU
START EDIT GRAPH CLEAR COPY TO DRAIN DEFROST FLUSH OPTIONS
HELP
Select Run with ↑↓, Menu Item with ↔ keys, press START to execute
Starts selected Run using parameters stored

This prompt will be displayed on the **SELECT RUN** screen.

Press **Y** to close the system down or **N** to select another run.


Version: 02.01
Build: Jun 24 2003 09:02:40
SHUT DOWN SEQUENCE STARTED
Pump purging for 30 minutes prior to shutdown
Press START key to re-start Evaporator ...
Purge Time: 00:00:09

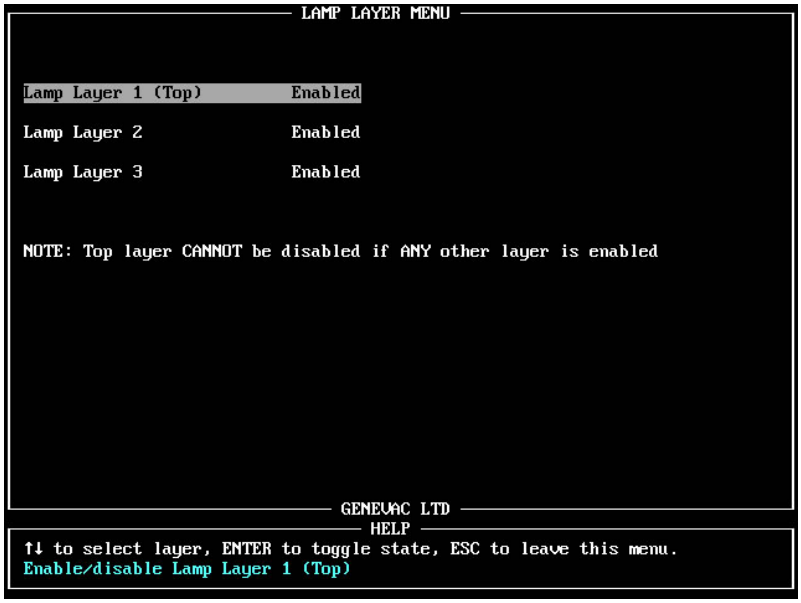
- The **SHUT DOWN** screen will be displayed when you select the **Y** response.
- You can restart the run by pressing **START** at any point.
- You can abort Shutdown by pressing **START** at anytime.
- If you want to start a different run, press **STOP**, select **N** and press **ESC** to display the **SELECT RUN** screen.

The **USER MENU** is displayed by selecting **OPTIONS** from the **MENU** in the **SELECT RUN** screen.

LAMP LAYER SELECTION

- In **LAMP LAYER SELECTION** you can enable or disable different lamp layers.
- Press **ESC** to leave this menu

Use the cursor keys to select the **LAMP LAYER SELECTION** and press **ENTER**.


LAMP LAYER MENU
Lamp Layer 1 (Top) Enabled
Lamp Layer 2 Enabled
Lamp Layer 3 Enabled
NOTE: Top layer CANNOT be disabled if ANY other layer is enabled
GENEVAC LTD
HELP
↑↓ to select layer, ENTER to toggle state, ESC to leave this menu.
Enable/disable Lamp Layer 1 (Top)

- Use the **UP** and **DOWN** cursor keys to select the lamp layer you wish to disable or enable.
- Use the **ENTER** key to toggle between **Enabled** and **Disabled**.
- Press **ESC** to exit this screen.

OPERATOR CONTROLS

- In **OPERATOR CONTROLS** you can adjust the screen brightness to suit your viewing angle.
- You can turn the audible warning off or on.
- Press **ESC** to leave this menu

Use the cursor keys to select the **OPERATOR CONTROLS** and press **ENTER**.

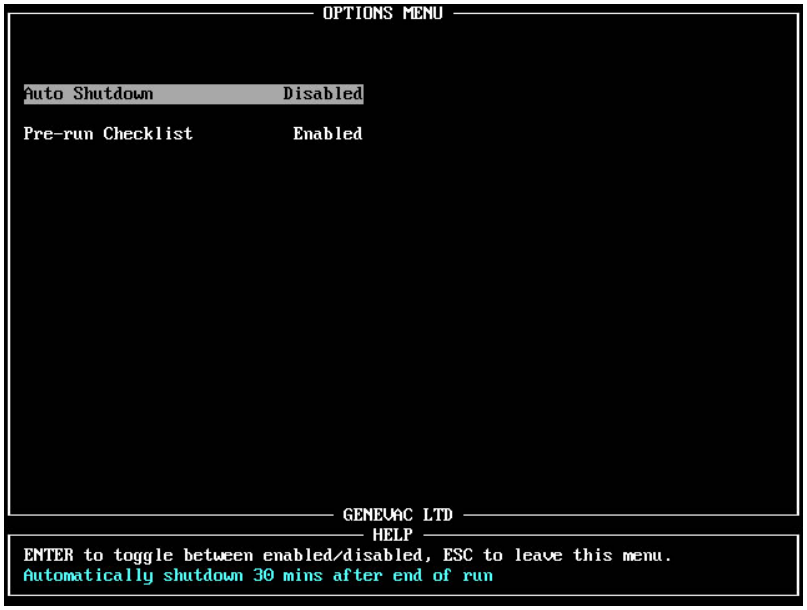
CONTROLS MENU
Adjust Screen Brightness
Keypress Beep On/Off Off
User Intervention Beeps On/Off Off
End of Run Beeps On/Off Off
GENEVAC LTD
HELP
↑↓ to move to required option, ENTER to select, ESC to leave this menu
Adjusts brightness and optimum screen viewing angle

- Use the **UP** and **DOWN** cursor keys to adjust the screen brightness to suit your viewing angle.
- Toggle the beep **ON** or **OFF**.
- Press **ESC** to exit this screen.

OPTIONS

- In **OPTIONS** you can Enable or Disable the **Auto Shutdown** function.
- You can disable the **Pre-run Checklist** prompt screen
- Press **ESC** to leave this menu

Use the cursor keys to select the **OPTIONS** and press **ENTER**.


OPTIONS MENU
Auto Shutdown Disabled
Pre-run Checklist Enabled
GENEVAC LTD
HELP
ENTER to toggle between enabled/disabled, ESC to leave this menu.
Automatically shutdown 30 mins after end of run

- Use the **ENTER** key to toggle between **Enabled** and **Disabled**.
- Press **ESC** to exit this screen.

THIS OPTION IS TO ONLY BE USED BY QUALIFIED ENGINEERS.

MAINTENANCE

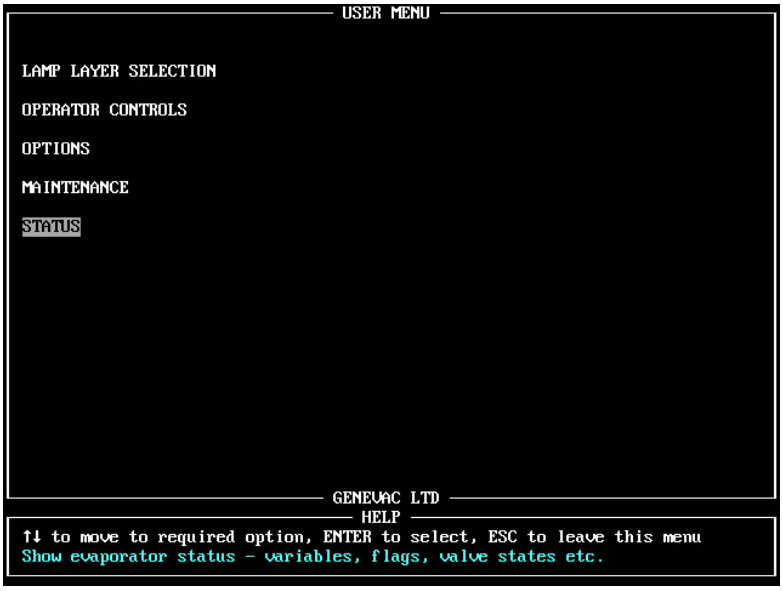
Only in exceptional circumstances, under guidance from Genevac, will non-qualified personnel be required to use this option.

- In **MAINTENANCE** you can write the machine settings to file.
- Press **ESC** to leave this menu

Use the cursor keys to select **MAINTENANCE** and press **ENTER**.

MAINTENANCE MENU
WRITE MACHINE SETTINGS TO SIMUL.INI
GENEVAC LTD
HELP
↑↓ to move to required option, ENTER to select, ESC to leave this menu
Writes current machine settings for use in simulation mode

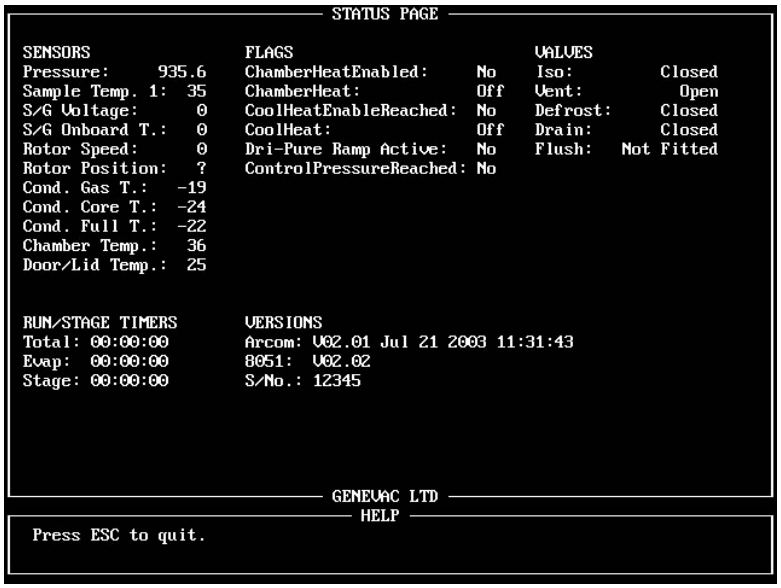
- Use the **ENTER** key to write the machine settings to the file "**SIMUL.INI**".
- Press **ESC** to exit this screen.



STATUS

Not required under normal conditions. This option displays information useful to Genevac personnel in resolving technical issues.

- In **STATUS** you can write the machine settings to file.
- Press **ESC** to leave this menu



Use the cursor keys to select **STATUS** and press **ENTER**.

- The current status of the evaporator is displayed.
- Press **ESC** to exit this screen.

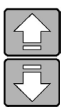
5.8 How to enter control data

The following pages describe how to enter run data, acceptable values and options that may or may not be available for your particular setup.

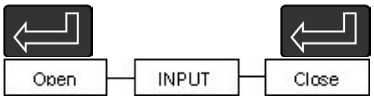
All control data is entered from the **RUN DATA** screen.

From start up of the system and the software control screen, press **START** to display the **SELECT RUN screen**.

Select the **VIEW/EDIT DETAILS** option and press **START** to display the **RUN DATA screen**.



Use the **UP** and **DOWN** cursor keys to move between fields.



Unless otherwise stated, press **ENTER** to 'open' a field, input your requirement and press **ENTER** again to 'close' the field.

Run Data Locked	When set to **Yes** this setting protects the run data from inadvertent corruption, **Password** prevents others from editing your run requirements. Press the **ENTER** key to toggle between **Yes, No** and **Password**. Note that you will **not** be able to make amendments or additions if the data is **locked**. Lock the data after completing the run entry.
Next Run Number	This control enables you to link and loop runs in any sequence. If you want to link runs, list the number of the run you want to follow the run you are entering. Repeat this process for any subsequent runs you would like to link. You can also loop a run. The limitation of how many runs you can link will be either the maximum run time of 99 hours 59 minutes or 99 different steps. Linked and looped runs can always be interrupted by manually stopping the system. Use the **DOWN** cursor key to move to the next field.
Run Name	Enter the title of the run that should be no more than 20 characters long. Use the **DOWN** cursor key to move to the next field.
Sample Holder Type	Press **ENTER** to display the **Select Sample Holder** drop down menu. Use the **UP** and **DOWN** cursor keys to select the option and press **ENTER**. If **OTHER** is selected, the description should be no more than 20 characters long.
Sample Volume	Press **ENTER** and input the volume in mls.
Solvent	Press **ENTER** to display the **Solvent** Drop down menu. Use the **UP** and **DOWN** cursor keys to select the option(s) and press **ENTER.** Once your selection has been made select **Done** and press **Enter**, you are now given a **new** option to **Auto Program** the remaining run parameters. If **OTHER** is selected, the name should be no more than 31 characters long, press **ENTER** to return to **Solvent** drop down menu.

Select **Done** and press **ENTER**.

IR Sensor Control Temperature

Press **ENTER** and input the temperature you wish to limit the sample to during evaporation.

This can be in the range of -20 to +70° C.

NOT AVAILABLE WITH SAMPLEGUARD

Note that if not specified, the default setting is 40° C.

SampleGuard Control Temperature

Press **ENTER** and input the temperature you wish to limit the sample to during evaporation.

This can be in the range of -20 to +70° C.

NOT AVAILABLE WITH IR SENSOR

NOT AVAILABLE FOR LYOPHILISATION

Note that if not specified, the default setting is 30° C.

Note this is not available for **Lyophilisation**.

Sample Guard Control Channel

Press **ENTER** and input the channel on which you want to control temperature.

Channel 1 will normally be assigned to the probe in the sample holder and Channel 2 to the probe in the sample.

NOT AVAILABLE WITH IR SENSOR

NOT AVAILABLE FOR LYOPHILISATION

Note that when powered down, this setting defaults to Channel 1 as the control channel.

Note this is not available for **Lyophilisation**.

Coolheat Enable Pressure

Press **ENTER** and input the pressure below which you want the lamps to be turned on.

NOT AVAILABLE FOR LYOPHILISATION

This can be in the range of 5-400 mbar.

If nothing is selected, the setting will default to 400 mbar.

Note this is not available for **Lyophilisation**.

Chamber Temperature Control

Press **ENTER** and Select the method from the 3 options displayed:

Wait for Chamber to Heat

Range from 0°C to 45°C.

Wait for Chamber to Cool

Range from 0°C to 45°C.

Automatic Control

Temperature is automatically set to an optimised figure for the recognised solvent / mixture selected.

Input the minimum temperature you want the chamber to reach before spin-up will commence.

Rotor Speed	Press **ENTER** to display the **Select Rotor Speed** drop down menu. Use the **UP** and **DOWN** cursor keys to select **Low** or **High** or **Lyophilise** (optional at order). Low speed applies nominally 300 G and high speed nominally 500 G. **Lyophilise** applies nominally 50 G at a very low rotor speed. Selecting the **Dri-Pure** option described later will over-ride this option and sets it to **High**. If nothing is selected, the setting will default to **LOW** speed.
Heat-Off Option	Select either: Elapsed Time, Heat Flow or Sample Detection. For Elapsed Time enter value in hours and/or minutes
ONLY ELAPSED TIME IS AVAILABLE WITH IR SENSOR	
Heat Flow	Only requires 1 SampleGuard probe. This MUST be used to control the sample holder or swing temperature. Either channel 1 or channel 2 may be used, ensure that the channel chosen is selected as the control channel in the run options. Automatically detects dryness by monitoring the rate at which the solvent is evaporating. Low solvent loading or if the lamps are turned off may cause Heat Flow to fail. If failure occurs, select one of the other two options. For very low solvent loading, requiring very little heat, then the following would be used:
NOT AVAILABLE WITH IR SENSOR **NOTE:** **Control Channel Probe** **MUST be placed in the swing or sample holder**	
Sample Detection	Requires both SampleGuard probes, Channel 1 to monitor the swing/holder temperature and Channel 2 in the centre well of the sample holder to monitor sample temperature. Monitors the temperature difference between the 2 channels. When the temperature difference reaches the preset figure (Not user configured), the run is terminated.
NOT AVAILABLE WITH IR SENSOR	

Heat-Off Elapsed Time

This can be in a range of 0 (lamps off for the entire run) to 99 hours 59 minutes.

End-of-Run Option

This option is the elapsed time after which the run will be stopped.

End-of-Run Elapsed Time

Press **ENTER** and input the time after which you want the run to stop.

This can be in the range of 1 minute to 99 hours 59 minutes.

End of Run Defrost and Drain

Press **ENTER** to toggle between **Yes** and **No**. Only available between linked runs and is typically used to remove mixed solvents.

Pressure Control Regime

Press **ENTER** to display the **Select Pressure Control Option** drop-down menu.

Use the **Up-Down** cursor keys to select the pressure option required.

Full Vacuum

Full Vacuum will take the chamber pressure down to the vacuum capability of the pump.

Controlled Pressure

When the **Controlled Pressure** option is selected, the **Controlled Pressure** field will be displayed.

Move down to this field using the **DOWN** cursor key and press **ENTER**.

Input the pressure you want the chamber to be limited to in the range of 0 to 500 mbar.

Dri-Pure

NOT AVAILABLE FOR LYOPHILISATION

DRI-PURE reduces the vacuum over a predetermined period to 50 mbar, then goes to the control pressure as set by the user.

This feature is particularly useful in preventing bumping, (the violent boiling of solvents), resulting in solvents being expelled, which is a source of cross contamination of samples.

Bumping can also cause products to be deposited on the glass lenses of the Coolheat lamps, which eventually results in breakages.

Note that during the **DRI-PURE** cycle, which is approximately 40 minutes, the Coolheat function will be disabled.

Variable Dri-Pure

NOT AVAILABLE FOR LYOPHILISATION

Variable Dri-Pure allows the user the option to set:

1) The pressure at which the vacuum ramp will start.

2) The pressure at which the vacuum ramp will end.

3) The total duration of the vacuum ramp.

4) Final Controlled Pressure.

6 Trouble Shooting and Maintenance

Information to be included when available

7 Technical data

Mechanical Data

Max rotor RPM	1300 ± 1.5%
Max rotor RPM DriPure	1800 ± 1.5%
Max G	500
Drive system	Direct Drive
Operating imbalance	85g maximum when 1 system is being used. 65g maximum per system if both being used.
IR lamp number/evaporator	4 (HT-8) 6 (HT-12)

Condenser Specification

Temperature	-45ºC
Main pot capacities	6 litre
Pump exhaust pot	1 litre
Chamber construction	316*L* stainless steel
Condenser drain valve	316*L* Stainless steel / PTFE
Rapid defrost	Yes

Vacuum System

Vacuum display	0-1200 mbar
Vacuum control	automatic, *0* mbar - atmosphere
Vacuum ramp	Yes
DriPure	Optional
SampleGuard	Optional
System ultimate vacuum	0.4 mbar
Auto vacuum vent valve	Yes

Electrical

UK and Europe	3 x 230Vac (± 10%) 50 Hz, 1-phase. Each supply not greater 13A (3 x Schuko for Europe, including Switzerland, Denmark & China)
USA	3 x 208V ac (±10%), 60Hz, 1-phase. Each supply not greater 15A
Max power requirement (peak)	Approx. 6.5 kW with high power lamps. (30Amps estimated)

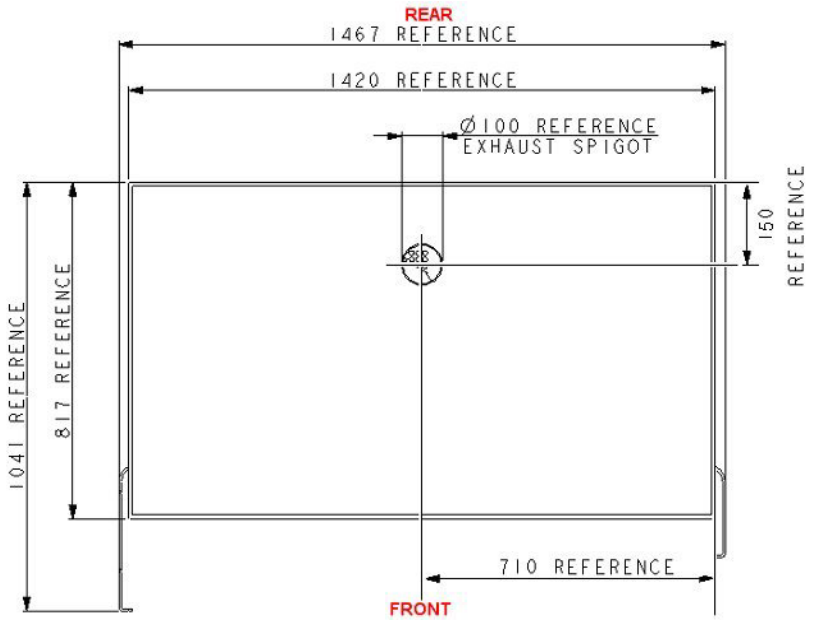
Technical data (Continued)

Fume Hood Extraction

In-flow velocity (min)	0.5 m/s
Extraction pressure	25 – 50 Pa

Dimensions

Width	1346 mm 1420 mm with fume hood 1467 mm side doors open
Depth	712 mm 817 mm with fume hood
Height	1685 mm 1915 mm with fume hood
Weight	700 kg approx



Operating Environment

Typical location	HT synthesis or lab. environment, clean & quiet in proximity of sensitive equipment.
Atmospheric pressure	900-*1200 mbar at sea level; 750-1000 mbar at altitudes of 1600m.*
Temperature	15°C to 30°C
Humidity	35% - 70% rH

Emissions

Noise	Not exceeding 66dBA at one metre from the evaporator (Measured during DEFROST and DRAIN cycle).

8 EC Declaration of Conformity

We Genevac Limited

Declare that this product:

HT-24 Series II Workstation

Conforms with the relevant Essential Health and Safety Requirements of the European Machinery Directive (89/392/EEC as amended by 91/368 EEC and 93/44/EEC). The EMC Directive 89/336/EEC and the Low voltage Directive 73/23/EEC.
***See note opposite**.

Conformity is demonstrated by compliance with the following specifications:-

BS EN ISO 12100 pts 1 & 2:2003, Safety of Machinery - Basic concepts, general principles for design.

EN 60204-1: 1998, Safety of machinery– Electrical equipment of machines-Pt 1 General Requirements

EN 294: 1992, Safety of machinery – Safety distances to prevent danger zones being reached by the upper limbs.

EN1088: 1996, Safety of machinery. Interlocking devices associated with guards. Principles of design and selection.

BS EN 61326: 1998, A1, A2 Electrical Equipment for measurement, Control and Laboratory use – EMC Requirements.

BS EN 61000-3-2: 2001, Electromagnetic compatibility (EMC). Limits. Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

BS EN 61000-3-3: 1995, A1, A2 Electromagnetic compatibility (EMC). Limits. Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <= 16 A.

BS EN 61010-1: 1993, Safety requirements for electrical equipment for measurement, control and laboratory use.

BS EN 61010-2-020, 1995, Safety requirements for electrical equipment for measurement, control and laboratory use. Particular requirements for laboratory centrifuges.

*** Note:** Under the Low Voltage Directive, 73/23/EEC, the limit for earth leakage current for Class1 portable equipment is specified at 3.5mA. Whilst every effort has been taken to minimise the leakage current of the HT-24, it may slightly exceed this value at, typically, 4.6mA. This is normal and does not indicate a problem with the system.

9 Safety

WARNING!

THIS SYSTEM MUST BE EARTHED

THIS EVAPORATOR IS A SAFETY CLASS 1 PRODUCT ACCORDING TO IEC CLASSIFICATION. IT MUST NEVER BE USED WITH ANY INTERRUPTION TO THE SAFETY EARTH CONDUCTOR. IT IS AN INSTALLATION CATEGORY II PRODUCT AND IS INTENDED TO OPERATE FROM A NORMAL SINGLE-PHASE SUPPLY.

THIS EVAPORATOR HAS BEEN DESIGNED TO BE USED IN A POLLUTION DEGREE 1 ENVIRONMENT (NO POLLUTION, OR ONLY DRY NON-CONDUCTIVE POLLUTION).

ANY MAINTENANCE OR REPAIR OF THIS PRODUCT SHALL BE CARRIED OUT BY GENEVAC PERSONNEL (OR APPROVED REPRESENTATIVES OF GENEVAC) USING ONLY APPROVED SPARE PARTS

10 Warranty Statement

This product is guaranteed for period of 12 months from the date of delivery to site. In the unlikely event of any defect arising due to faulty materials or construction resulting in system failure, the unit will be repaired free of charge. This to include all labour and component costs incurred.

This warranty is subject to the following provisions:

1. System must be sited, installed and operated in accordance with operator instruction manual.

2. Unit only used for purpose it was sold, and in accordance with Genevac published compatible solvent list.

3. Regular cleaning and preventative maintenance schedule to be adhered to as detailed in operator's manual.

4. Warranty does not cover accidental damage, misuse, modifications or inappropriate repair by untrained personnel.

5. Warranty does not cover consumable items*

Failure to adhere to the above would result in the costs of repairs being charged.

* Consumable Items:	Sample Guard thermocouple probes
	Cole Vacuum Pump oil
	Control fuses

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(1) 845 267 2211

Fax (1) 845 267 2212

Email: atlas@genevacusa.com

11 Useful information

If you need to contact Genevac for assistance, use either the telephone or fax Hotlines given.

It will always help Genevac Service if you have the serial numbers at hand for the components of your system

If you need to contact Genevac Sales for information on Service Contracts or products, use the telephone or fax Hotlines given.

Alternatively, Email or visit our web site.